Before the
Federal Communications Commission
Washington, D.C. 20554

MM Docket No. 87-267

In the Matter of

Review of the Technical
Assignment Criteria for the
AM Broadcast Service

NOTICE OF PROPOSED RULE MAKING

Adopted: April 12, 1990; Released: July 18, 1990

By the Commission: Commissioner Barrett issuing a separate statement.

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I. INTRODUCTION

1. This *Notice of Proposed Rule Making* (*Notice*) constitutes the penultimate step toward the achievement of this Commission's overall goal for AM broadcasting - the transformation and revitalization of the AM broadcast service by the year 2000. For the first fifty years since its debut in the 1920's, AM radio's contribution to daily life in America was unquestioned. As our first national medium of mass communications, AM radio united the nation in good times and bad. It brought the voices of national and international leaders into our homes, making us witnesses to history. It entertained us. Each night families and friends gathered around the radio and tuned to AM stations to learn of world, national and local events and to hear the latest episode in their favorite radio show. During the last twenty years, however, channel congestion, interference and low fidelity receivers have taken their toll, dulling the competitive edge of this once vital service. Not surprisingly, once loyal AM listeners have shifted their allegiance to newer mass media services that offer them higher technical quality.

2. As a result of these developments, the once preeminent AM service is now in critical need of attention. For the past several years the Commission has involved itself in an intensive effort to identify the service's most pressing problems and the sources of and solutions to those problems. In September of last year we challenged broadcasters, radio manufacturers and the listening public to tell us how we could revitalize the AM radio service. In an *en banc* hearing lasting a full day in November they responded to the challenge. Their response reaffirms our conviction that a concerted effort by this Commission, the broadcasting community and radio manufacturers can rejuvenate the AM radio service. In this *Notice* we set forth our comprehensive strategy to reach this objective, a strategy requiring coordinated action by both the Commission and the industry.

3. One principal point must be recognized at this juncture. In developing the proposals contained in this *Notice*, our focus has been on what measures will, in our judgment, attain the objective of restoring the AM service rather than on measures that might more directly benefit one or more segments of the industry itself. Therefore, we acknowledge that the actions we propose today will not satisfy those whose primary focus has been on one particular segment of the industry. Nevertheless, in this Rule Making we are dealing with no less an issue than the survival of the AM service. In light of that fact, the Commission trusts that those commenters whose interests are not fully realized by these proposals will perceive that we have attempted to balance their individual perspectives and needs with the overarching need to revitalize the AM service as a whole. We will now turn to our specific proposals.

II. GOAL

4. To provide specific structures for the revitalization of the AM service we have defined two models, one for the new spectrum between 1605 and 1705 kHz, and a variation for the existing band between 535 and 1605 kHz. These models will serve as two focal points for defining the future of the AM service. Our intention is to encourage and approve those measures which move the service in the direction of the models; similarly, we intend to discourage and disapprove proposals that do not.

5. The model for what has come to be called the expanded band (1605-1705 kHz) enjoys the advantage that it will apply in the spectrum as yet unused by broadcasters. Therefore we can select for it those characteristics that are both desirable and immediately attainable.

Model I: 1605-1705 kHz

- o Fulltime operation with stereo modulation
- o Competitive technical quality
- o 10 kW daytime power
- o 1 kW nighttime power (more, if circumstances permit)
- o Non-directional antenna (or simple directional array)
- o 400-800 kilometers (249-497 miles) separation between co-channel stations

A model I station should possess a daytime service radius of 56 to 72 kilometers (35 to 45 miles), free from co-channel and adjacent channel interference. This service radius will obviously be less during the night depending on actual separations, power and number of operating stations. Station separations will vary depending on geographic location.

6. The model for the existing broadcast band, however, must reflect the fact that the band is densely populated with stations having wide variations in power, spacing, antenna patterns and protection from interference. Because these and other considerations make it very difficult to define ideal or uniform characteristics, we have selected for our second model those attributes toward which the service should aspire as a minimum.

Model II: 535 - 1605 kHz

- o Fulltime operation with stereo modulation
- o Competitive technical quality
- o Daytime coverage - 6400 square kilometers (2500 square miles), free of co-channel and adjacent channel interference
- o Nighttime coverage - at least 15% of daytime coverage, free of co-channel and adjacent channel interference
- o Simplified antenna arrays

In both models the term "competitive technical quality" means a level of audible quality that is competitive with FM broadcasting when heard in the typical automobile and home environment. We seek to achieve that quality while preserving and building on AM's distinctive ability to cover large distances without disruptions caused by shadowing and multipath interference.

7. Model I is based on the technical criteria used to develop the allotment plan for the western hemisphere.[1] The co-channel separation has been increased so as to assure better nighttime service. We anticipate that stations will operate with these parameters. Model II is somewhat reduced to account for a greater density and variety of stations. The expected non-directional service radius is approximately 45 kilometers (28 miles) during the day and 18 kilometers (11 miles) at night. We believe it highly desirable for all stations to attain these values *or better*. We seek comment on both of these models, particularly with regard to our inclusion of stereo broadcasting. In the expanded band (Model I), should all stations be required to transmit in stereo or should a commitment to transmit in stereo be treated as a preference factor? In the existing band (Model II), should stereo transmissions become mandatory as a part of any measure to increase service and reduce interference or after a certain number of years?

8. As we endeavor to move toward a model service, we must also deal with the many problems that exist today. Apart from competition from FM broadcasting, AM stations must contend with skywave interference, irregular coverage, irregular operating hours, poor receivers and interference from nature and electrical devices. These factors have reduced the attractiveness of AM, as its audience share shows. There is a critical need to restore the technical and operational integrity of the service. It would disserve the public and lead to further deterioration if we were simply to continue adding new stations.

9. Our comprehensive strategy to move from a troubled to a model service depends on a reduction in the density of stations. The particular plan we have developed calls for the Commission to use three weapons from its regulatory arsenal to attack interference and congestion on AM channels. First, we intend to revise and implement the AM technical standards in such a manner as to achieve a reduction in the interference with which AM broadcasters must contend in their primary service areas. Through a series of discrete Rule Making proceedings, we have already begun this task. In this docket, however, we will coordinate the timing and substance of revised technical standards so that they do, in fact, lead to a significantly improved AM service. Second, we intend to give broadcasters both the ability and the incentive to use their own initiative to improve AM radio service to the public. Again, we have already begun this effort. In a *Report and Order* [2] adopted today, we authorize licensees to undertake private negotiations to reduce interference among AM stations. To encourage broadcasters to use this tool, we now propose that the Commission issue tax certificates to broadcasters agreeing to reduce interference to co-channel or adjacent channel stations. To create an additional incentive for licensees to reduce interference, we also propose a limited relaxation of our multiple ownership rules. We propose to permit ownership of AM stations with overlapping principal city contours if the licensee agrees to adjust operation of either station to reduce co-channel or adjacent channel interference to other AM broadcasters.

10. A recent international agreement (see paragraph 16, *infra*), which becomes fully effective in July 1990, has allocated ten additional channels to the domestic AM radio service. This allocation offers us a unique opportunity to reduce congestion and interference on existing AM channels. It is an opportunity that we intend to seize. Thus, the third step in our plan to improve AM service will be to encourage those AM stations making the most significant contribution to congestion and interference in the existing band to move their operations to one of the new channels. This *Notice* proposes principles to govern allocation and assignment of these new channels as well as eligibility criteria and preferences designed to achieve this objective.

11. As part of our strategy to improve transmission quality, we will also seek to improve the performance of receivers. In particular, we aim to use the draft recommendation of the National Radio Systems Committee to define the characteristics of a good quality receiver which we would use to develop standards for improving

the AM service. While we would not require radio manufacturers to incorporate these characteristics in their products, we believe such a model would serve as a useful benchmark for government and industry.

12. We believe the Commission must take each of the steps outlined above if we are to raise the quality and thus the competitive posture of the AM radio service significantly. This Commission action is only the first component of our strategy to restore AM radio's competitive edge. For our strategy to succeed, both AM broadcasters and radio manufacturers must make a commitment to take those actions within their power to meet the public demand for a technically superior service. The *en banc* hearing has convinced us that each is ready to make that commitment. For this reason we are confident that, working together, this Commission and the industry can create a revitalized AM service, a service of superior technical quality that can meet fully the communications needs of the American public as we enter the twenty-first century.

III. HISTORY

13. *Domestic.* On April 3, 1986, the Mass Media Bureau released a report examining many of the technical, legal, and policy issues related to the AM broadcast service. [3] The *Report* sought to identify changes to existing rules that would free AM broadcasters to meet the competitive challenges facing them and to enhance their service to the public. Comments received in response to the *Report* guided the Commission's subsequent efforts to identify technical issues ripe for further study.

14. The first of these was an omnibus *Notice of Inquiry (Inquiry)*[4] initiating a comprehensive review of the complex, interrelated technical principles that underlie AM station assignment criteria. The *Inquiry* asked whether we should revise field strength values for the protected contours of AM stations, the prescribed minimum usable field strength, the prescribed co-channel and adjacent channel protection ratios, and the way we measure the effects of atmospheric and man-made noise, and skywave and groundwave propagation. In addition, the *Inquiry* asked whether the public would benefit if we permitted interested parties themselves to resolve interference rights and responsibilities through private negotiations. The Commission promised to begin Rule Making actions when the record developed supported such action.

15. The comments filed in response to the *Inquiry* prompted Commission action on several fronts. In 1988, the Commission opened five rule making proceedings proposing changes to its technical rules[5] and a sixth proposing policy changes to achieve interference reduction through voluntary agreements among AM licensees.[6] We have taken final action in three of these proceedings today. We believe this will help the Commission and industry resolve more quickly those issues remaining before we can achieve our ultimate goal, a revitalized AM broadcast service. We will, however, delay the effective dates of the associated rule changes until we complete our work in this proceeding. These delays will permit us to coordinate all the changes required to assure a positive net result. As to the the remaining three technical rule makings, we will consider them further herein.

16. *International.* The 1979 International Telecommunication Union World Administrative Radio Conference (WARC) allocated 1605-1705 kHz to the broadcasting service in Region 2 (the western hemisphere), giving that service an exclusive allocation of 1605 to 1625 kHz and primary status from 1625 to 1705 kHz with implementation to occur in accordance with a future regional plan. A two-session Regional Administrative Radio Conference (RARC) held in 1986 and 1988 planned the spectrum and produced the rules under which we would share this new allocation with the other nations of Region 2.[7]

17. The RARC adopted an allotment plan for the ten additional channels (1610-1700 kHz) made available for AM broadcasting in this hemisphere. With few exceptions,[8] the U.S. was allotted 1620, 1640, 1660, 1680 and 1700 kHz for nationwide use. Generally, these channels were alloted for use in the U.S. without restriction except in the vicinity of Canada and Mexico, where adjacent channel coordination would be required. The remaining frequencies were allotted to Canada and Mexico, and therefore their use in the U.S. within 330 kilometers (205 miles) of either border would be restricted.[9] The Conference also adopted technical standards[10] including minimum spacings of 330 kilometers (205 miles) between broadcast stations on the same channel and additional technical criteria designed to ensure that non-broadcast use does not interfere with broadcasting.

IV. ASSOCIATED RULE MAKINGS

18. We now briefly describe the six AM rule making proceedings that followed the *Inquiry*.

19. *MM Docket No. 88-508.* This proceeding considered changes to the way we calculate skywave field strength. We proposed to use a new, more accurate skywave propagation model that takes into account the effects of the geomagnetic latitude of the propagation paths. We also proposed changes to our rules for calculating skywave field strength. In a *Report and Order* adopted today, we are making these changes to our rules.[11] With these changes, we should be able to depict more accurately nighttime skywave service and interference on all channels.

20. *MM Docket No. 88 - 510.* This proceeding considered changes to the way we calculate groundwave field strength. We proposed to replace our groundwave curves with new ones that would cure certain "curve fitting" deficiencies. In a *Report and Order* adopted today, we are substituting these new groundwave propagation curves for the current curves.[12] Using these new curves, we should be able to predict more accurately groundwave service and interference.

21. *MM Docket No. 89 - 46.* A *Report and Order* adopted today will allow licensees, subject to Commission approval, to reach agreements to make facilities changes that would reduce interference and will eliminate the "grandfathering" of deleted AM stations.[13] Specifically, the Commission will accept contingent applications that would reduce AM interference but will not entertain competing applications in those situations. Additionally, we wish to avoid "daisy-chain" applications when considering interference reduction agreements. These arise when a series of proposals serving substantially different areas become interlocked (or mutually exclusive) because of prohibited overlapping contours. *See* paragraph 56, *infra.*

22. *MM Docket No. 88 - 376.* In the *First Report and Order* in this proceeding,[14] we adopted, with minor modifications, the National Radio Systems Committee (NRSC) emission standard. Equipment meeting this standard will reduce its emitted AM signal bandwidth, and consequent-

ly the level of adjacent channel interference. This should encourage manufacturers to produce receivers with wider effective bandwidth, thereby improving AM service fidelity. This new emission standard goes into effect June 30, 1990, and will serve as a basis for any new adjacent channel protection ratios.

23. Awaiting action in the same docket is a proposal to revise Section 73.37(b) of our rules to allow AM applicants to accept some service contour overlap. Under this proposal, applicants for new or modified AM facilities could elect to protect their 1.0 mV/m daytime contour rather than the traditional 0.5 mV/m daytime contour, provided they fully protect all other stations. For the reasons given in paragraph 31, *infra*, we will take no further action on this proposal and will terminate the docket.

24. *MM Docket No. 88 - 509.* Commission rules currently allow certain daytime-only stations to operate during nighttime hours. Under these rules, however, many daytime-only stations can operate at night only with very low level power. In this proceeding, we proposed to eliminate restrictions on the antenna systems that could be used for such nighttime operations to compensate, in part, for the power restrictions. Because these proposals are closely related to our current AM improvement efforts, we believe that they should be considered herein. *See* paragraph 42, *infra*, for further discussion on this subject. To permit a proper evaluation of the issues, we will incorporate herein the record developed in MM Docket No. 88-509. In view of this, no further action appears necessary and we delegate authority to the staff to terminate MM Docket No. 88-509.

25. *MM Docket No. 88-511.* In this proceeding, we proposed to revise the procedures for calculating nighttime protection levels of AM stations. In particular, we proposed to modify how we calculate nighttime RSS (root-sum-square) interference levels of Class II and Class III stations, and the skywave service contours of Class I stations. Because these proposals are closely related to our current AM improvement efforts, we believe that they should be considered herein. *See* paragraphs 38-41, *infra*, for further discussion on this subject. To permit a proper evaluation of the issues, we will incorporate herein the record developed in MM Docket No. 88-511. In view of this, no further action appears necessary and we delegate authority to the staff to terminate MM Docket No. 88-511.

V. TECHNICAL STANDARDS

26. *Introduction.* As the first step in our plan to improve AM service, we intend to revise our technical standards to force a reduction in the interference AM licensees face in their primary service areas. We intend to base our efforts to improve AM broadcasting on a solid technical foundation. Technical standards will guide our efforts to restore the existing band to a competitive position, to determine which stations should be given priority to migrate to the expanded band and to establish planning criteria to insure that stations in the expanded band exhibit Model I characteristics.

27. New technical standards applied to the existing band must reflect an awareness of a station's interference protection and radiation rights that were initially established on the basis of more relaxed standards. The process of restoration, however, requires that new stations or modifications to existing stations provide greater protection to other AM broadcasters than has been required in the past. The creation of technical standards striking a new balance between service and interference can achieve this. Because we do wish to accommodate some new stations and modifications to existing stations, these standards must continue to permit small incremental increases in interference to existing stations, but in limited circumstances and by an amount less than presently tolerated.

28. We believe that the process of migration to the expanded band should be based on a method that ranks existing band stations according to the total nighttime interference they cause. For this method to provide meaningful comparisons, we further believe that all nighttime skywave signals should be considered as sources of interference. This differs from our current practice which defines interference as occuring only if the calculated skywave field strength exceeds prescribed levels.

29. AM technical assignment principles are complex and interrelated. To be certain that the cumulative effect resulting from multiple rules changes will be an AM service of enhanced quality, we cannot ignore these relationships. Our technical assignment principles are based upon a system of "protected contours" that depends upon the frequency relationship of the protected station and the interfering station, the class of the former and its hours of operation. The field strength values defining these normally protected contours, called the nominal usable field strength, or E_{nom}, are chosen to assure satisfactory reception in the presence of atmospheric noise, man-made noise and interference from other transmitters. In defining the protected contour for each class of AM station, the Commission weighed these objective factors and other subjective factors.

30. *Normally Protected Contours.* During the past twenty years, the number of new radio stations, both AM and FM, has dramatically changed the listening habits of the public. The protected contours currently prescribed in our rules, however, were developed well before this significant growth. The *Inquiry* asked whether, weighing the habits of today's listening public, the field strength values of these protected contours should be redefined. The majority of commenting parties agreed that the contours should not be redefined. We tentatively conclude that changing these contours would not significantly improve AM service and consequently we propose to leave them unchanged. One minor exception to this conclusion is discussed in paragraph 44, *infra*.

31. In MM Docket No. 88-376, we proposed to allow stations to accept interference within their normally protected contour. Although adoption of this change would provide greater flexibility for stations seeking increased service areas, it would also foster increased congestion and distorted service areas. For this reason, we find such a revision inconsistent with our goal. Therefore, we will take no further action on this subject and delegate authority to the staff to terminate MM Docket No. 88-376. In a related matter, we note that Section 73.37(b) of the rules permits interference within the normally protected contour of a station that is the only licensed station in its community. Since the creation of additional interference is contrary to our goal of reducing interference, we propose to eliminate that rule. Comments are requested on this proposal.

32. Technical factors used to derive a station's protected contours are the minimum usable field strength, or E_{min},[15] and noise, both atmospheric and man-made.[16] In

the *Inquiry*, we asked whether these factors should be revised. The comments offered no compelling policy reason to revise these factors and we tentatively conclude that these factors should remain unchanged.

33. Noise within the AM band can also be generated by radio frequency (RF) devices, regulated under Part 15 of our rules, and by RF lighting, regulated under Part 18. In 1989, the Commission adopted a comprehensive revision of Part 15.[17] In that proceeding, several changes were made to reduce the potential for interference to AM reception from radio frequency devices. This included applying emission standards to all intentional and unintentional radiators, and changing to a more accurate method of measuring emissions. In 1983, the Commission adopted standards for RF lighting that limited, on AM frequencies, the amount of RF energy that could be conducted into AC power lines.[18] In 1986, the Commission proposed radiated limits for RF lighting[19] but declined to adopt them because the existing conduction limits have proven effective in reducing radiated emissions.[20]

34. *Protection Ratios.* Co-channel and adjacent channel protection ratios prescribe the maximum permissible interference from one station to another. Their values reflect a compromise between maximizing the quality of received AM signals and the number of AM broadcast stations. The *Inquiry* posed many questions to determine whether we needed to change these ratios to improve AM service quality. A majority of the commenters supported no change in the co-channel ratio, but an increase in the adjacent channel ratio. We tentatively conclude that no change in the co-channel protection ratio is warranted and address only adjacent channel protection ratios in this *Notice*.

35. *Adjacent Channel Protection Ratios.* Currently, first adjacent channel protection is afforded only to the daytime operation of stations on the basis of a 1:1 (0 dB) desired/undesired ratio. Adjacent channel nighttime skywave interference is not now considered. To assure protection from second and third adjacent channel interference, the current rules include no protection ratios but instead require that stations be separated a certain distance determined by the location of specific field strength contours.

36. A vast majority of comments strongly recommended changing the first adjacent channel ratio to a value approaching 16 dB. Many commenters cite two comprehensive studies commissioned by the National Association of Broadcasters.[21] A principal conclusion of the second study, known as the *Angell Study*, was that for adjacent channel interference, the preferred ratios were "16 dB for music, 16 dB for talk with talk interference and 20 dB for talk with music interference."

37. For the second and third adjacent channel cases, there were limited comments and no comments, respectively; and we infer that there is general satisfaction with our present requirements. Further we have no basis for seeking a revision and believe that our current standards are adequate. In view of the foregoing, we propose to change the first adjacent channel value to 16 dB with no change in our second and third adjacent channel protection requirements.[22]

38. *Nighttime Interference Calculations.* The current method of determining nighttime interference was adopted years ago to provide for orderly development of the AM broadcast service. The number of stations grew but at the expense of incremental increases in actual interference. The *Inquiry* proposed to limit increased interference by including adjacent-channel nighttime skywave interference in RSS calculations and by lowering the threshold (called the RSS exclusion) used to determine whether interference occurs. In response to our original proposal, the Radio Advisory Committee expressed concern that its adoption would lead to a net increase in interference in the AM band and suggested an alternative.

39. We believe that neither our original proposal nor the alternative suggested by the Advisory Committee would lead to the benefits we seek in this proceeding. We have tentatively concluded that more substantial change is required. In general, a station's normally protected contour at night currently ranges from 2.5 to 10 mV/m with the interference-free (RSS limitation) even higher. If we continued to protect high contour values, little improvement in AM service would be expected to occur. However, if we set the protection level low and consider only single signal protection, generally greater interference protection would be achieved. We initially believe that a 1 mV/m nighttime limitation would represent an appropriate protection level from which AM improvement would follow. Viewed in perspective, this value would be equivalent to protecting a 2 mV/m RSS (using 50% exclusion). Therefore, we propose that applications for new or modified AM stations would be acceptable if their individual nighttime limitations at the site of another co-channel or first adjacent channel station would not exceed 1.0 mV/m.[23] Consistent with this reasoning, for protection to skywave service of Class I stations, the maximum allowable level would be 0.25 mV/m at or within the 0.5 mV/m 50% contour. [24] This would be equivalent to protecting the 0.5 mV/m 50% contour (using 50% exclusion). In the event an existing station already causes a nighttime limitation in excess of either of the above values, modification of the station's operation will be acceptable if the calculated nighttime limitation described above is reduced by at least 10%. We seek comments on this proposal.[25]

40. Because of fading, skywave service generally lacks the quality of groundwave service. Further, because of the existing level of adjacent channel interference (which our technical rules currently ignore), we believe that our new protection criteria should assume the use of narrowband receivers at night. This assumption avoids an unacceptable trade-off between interference and service and allows listeners with narrowband radios to continue receiving skywave service. Thus, our proposal reflects an adjustment for adjacent channel interference to skywave service.

41. Although no longer required for determination of station protection under our above proposal, RSS calculations (without exclusion) would be used to evaluate city coverage of a station and to compute the ranking factor for migration preference purposes.

42. *Nighttime Enhancement for Daytimers.* For daytime-only stations, we propose adoption of the nighttime enhancement provisions appearing in MM Docket No. 88-509, including allowing separate daytime and nighttime antennas and transmitting sites and relaxed nighttime carriage requirements. As each station would be required to protect other stations in accordance with the new standards, no impact on other stations would result.

43. *Reclassification/Power Increases.* The omnibus nature of this proceeding makes it an appropriate docket to consider reclassifying AM stations to conform with the nomenclature used in international agreements to which the U.S. is a party. In general, Class I stations would be

renamed Class A stations; Class II and Class III stations would be labeled Class B; and Class IV stations would become Class C. The sub-classes, I-A, I-B and I-N would easily fit into a Class A category. However, sub-classes, II-A, II-B, II-C and III would, if changed to Class B, require changes to current protection levels.

44. We propose to adopt a nighttime protection level of 2.0 mV/m for all Class II-A, II-B, II-C and III stations. Whereas the selection of this level of contour protection would constitute an obvious improvement for Class II-B, II-C and III stations, it would appear to have a deleterious effect upon the service of Class II-A stations which are presently protected to the 0.5 mV/m contour. However, this consequence is essentially negated since 11 out of the 12 stations designated as Class II-A presently have service contours that are limited to values of 2.0 mV/m or greater with the twelfth being limited to a level of 1.8 mV/m. Stations presently possessing nighttime limits greater than 2.0 mV/m would be protected at the higher level. Additionally, we propose a power ceiling of 50 kW for Class B stations, which would allow stations to increase coverage in cases where all other technical criteria can be met. Comments are sought concerning these proposed changes to our AM classification system and associated changes to protected contours.[26]

45. We also propose the establishment of a fourth class of station which would facilitate the identification of those stations which lack fully protected unlimited-time operations. This category, Class D, would include all stations that are currently classified as: Class II-D, Class II-S, Class III-D and Class III-S. Creation of this separate class would help in providing a keener focus on a category of stations which has its own set of special needs.

46. *Advanced Antennas*. NAB is currently conducting tests on new types of antenna systems that might improve AM broadcast service. Licensees are experimenting with non-standard antenna systems (such as the PARAN antenna). We believe that we should defer changes in our antenna standards until these tests have been completed and their results analyzed.

47. *Split Frequency Operations*. Split frequency operation occurs when a station uses one frequency during the day and another at night. This mode of operation has been suggested as one possible solution to the problem daytime-only stations face. It would offer only a limited solution, however, because each daytime-only station would need to find an additional frequency that would permit operation without causing interference and that also would not preclude another daytime operation. Such frequencies are few in number and, in fact, exist only in the absence of an adjacent channel nighttime protection standard.

48. Up to now, we have treated split frequency requests on a case-by-case basis. We now tentatively conclude that split frequency operations use the spectrum inefficiently. Each such operation precludes reuse of as many as fourteen channels to varying degrees, compared to a seven channel preclusion for single frequency operations. Preclusion when skywave signal propagation is involved is even more pronounced and difficult to assess, particularly when we propose to accord stations first adjacent channel nighttime protection. Accordingly, we tentatively conclude that split frequency operations would be inconsistent with our efforts to improve AM service. Commenters who believe otherwise should address specifically how such operations would not impede our efforts to reduce interference and congestion.

49. *Expanded Band Technical Standards*. Before we can discuss anticipated coverage areas and other operational aspects of stations in the expanded band, we must first establish the technical standards that will define how we assign, and licensees construct, stations in the band. Currently, we have no rules governing broadcast use of the frequency range, 1605 to 1705 kHz. Because these frequencies are adjacent to the existing AM band, however, a vast body of relevant information concerning technical operation on adjacent spectral territory is readily available and can be easily applied to these frequencies. We propose that the technical standards applying to the existing AM band apply, generally, to operations in the expanded band.[27]

50. We wish to minimize the need for directional antennas in the expanded band. Whenever applicants propose to use directional antennas, we would require demonstration of antenna pattern achievement. Because the expected spacing between individual stations in the expanded band will provide adequate interference protection in the majority of cases, we anticipate that the engineering studies required of applicants will be significantly less burdensome than those required for stations in the existing band. Measured radials taken only in critical protection directions should be adequate to demonstrate compliance with radiation restrictions. We seek comment on our technical standards proposals for expanded band operations and the observations and assumptions on which they are based.

51. *City Coverage for Expanded Band Stations*. In the existing band, there is a fundamental requirement that licensees provide a minimum field strength over the community of license. Currently, during the day a 5 mV/m signal is required at all locations within a community; at night, a station's interference-free contour using the current RSS method must encompass the community of license. We routinely grant waivers of the nighttime coverage requirement when a licensee can show that at least 80 percent of the city will be served.

52. If a particular applicant were a suitable candidate for a specific allotment in the expanded band, but the Commission could not be assured of the requisite 100% nighttime coverage of its community, a plan possessing the flexibility to permit this assignment to be made without a burdensome waiver process would appear to serve the public interest. Consistent with such flexibility, the plan could still prescribe a required daytime coverage; complete 5 mV/m daytime envelopment has never been a problem for applicants to attain. Difficulties in meeting the prescribed coverage would arise only at night. This suggests that we should require only 50% nighttime city coverage (using the RSS method without exclusion) when we attempt to match applicants and allotments in the expanded band. We seek comment on this tentative conclusion and its underlying assumptions, including the option of allowing 50% on a temporary basis and ultimately returning to the 100/80% standard.

VI. CONSOLIDATION

53. A key goal of this proceeding is to reduce interference among stations in the existing AM band. This section, presenting the second prong of our three-prong plan to improve AM, explores changes to non-technical policies and rules intended to motivate broadcasters to reduce interference in that band. These changes include: (1)

granting tax certificates to AM licensees who receive payment from other licensees to surrender their licenses; (2) relaxing our multiple ownership rules to permit a licensee signficantly reducing interference to co-channel or adjacent channel stations to own AM stations whose 5 mV/m contours overlap; and (3) permitting little or no duplication of programming by commonly owned AM and FM stations serving the same area.

54. *Voluntary Arrangements*. Section 1071 of the Internal Revenue Code, 26 U.S.C. §1071, permits the Commission to issue tax certificates to the seller of a regulated property when that sale will give effect to a new or changed Commission policy concerning the ownership and control of radio broadcasting stations. These certificates enable a seller of broadcast property to defer any capital gain it realizes by acquiring a "qualifying replacement property" within two years of the sale or by reducing the basis of other depreciable property. The Commission has in the past used tax certificates to encourage, *inter alia*, voluntary divestitures of grandfathered ownership interests inconsistent with changes to its multiple ownership rules and broadcast property sales to minorities.

55. Voluntary agreements among licensees under which one licensee may pay another to surrender its license or to reduce interference to the first station can significantly improve the overall quality of reception by reducing congestion and interference in the existing AM band. For this reason, in MM Docket No. 89-46, the Commission has today adopted rules to encourage licensees to reach such agreements. But, as one commenter in that proceeding observed, the tax consequences of receiving compensation in such situations could discourage a licensee from entering into such agreements.[28] We now tentatively conclude that we should issue tax certificates to licensees receiving payment from other licensees to surrender their licenses, thereby reducing congestion or interference in the existing AM band. We seek comment on this tentative conclusion and ask commenters to discuss several related issues including:

(a) whether the use of tax certificates in this case would be consistent with our past uses of this tool;

(b) what are the tax implications of voluntary license surrender agreements, *i.e.*, how could they be structured to constitute a sale of property under 26 U.S.C. §1071;

(c) whether we should require a showing that interference will be reduced by some prescribed amount as a prerequisite to our issuing the certificate; and,

(d) when that certificate should issue.

We also seek comment on whether we should also issue tax certificates to licensees receiving payment from other licensees to reduce their service area. In particular, in this regard, we seek comment on whether and how such an agreement to reduce coverage would constitute a sale of property falling within the scope of 26 U.S.C. §1071 and how any tax certificate would apply in such a situation.

56. We are also concerned that parties filing contingent applications as part of a voluntary arrangement may find their applications mutually inconsistent with other applications, contingent or not. If clusters of contingent arrangements become entangled in this way, it could be years before the comparative hearing process can resolve which proposals should be approved. Both private and public interests would suffer because the improvements to AM service promised by these arrangements would be delayed. We propose three measures to avoid this outcome. First we would require that no application to move to a frequency in the expanded band be part of any package of contingent applications associated with a voluntary agreement. We would also give the proponents of mutually exclusive clusters of applications a period of sixty days to resolve their conflicts and to file modified proposals curing them. That period would run from the date we issue a public notice identifying their conflict. Finally, recognizing the potential for delay inherent in the comparative hearing process, we propose instead of having comparative evidentiary hearings to use a simple, objective criterion to select between or among mutually exclusive clusters of contingent applications unable to resolve their conflicts in the allotted time. This approach would be similar to the one followed in awarding licenses in the Instructional Television Fixed Service.[29] Because we find it to be consistent with our primary goal in this proceeding, the improvement of the AM broadcast service, we propose to use the measure of net interference reduction associated with each cluster of contingent applications as the decisive criterion. We seek comment on these measures and any others we might use to reduce and to resolve quickly and fairly conflicts among groups of contingent applications designed to improve the AM service.

57. *Common Ownership of AM Stations with Overlapping Contours*. In October 1988, we relaxed Section 73.3555(a) of our rules to prohibit cognizable ownership interests in two or more commercial AM stations if their predicted or measured 5 mV/m groundwave contours overlap.[30] We now propose to relax the rule even more if this would help reduce interference in the existing AM band. We tentatively conclude that we should consider waiving the contour overlap rule, on a case-by-case basis, to permit common ownership of two commercial AM stations with overlapping 5 mV/m contours if an applicant shows that a significant reduction in interference to adjacent or co-channel stations would accompany that common ownership. Simultaneous broadcasting of the same program on both stations would be permitted if the stations served substantially different markets or communities. In this case-by-case analysis, we would, of course, remain sensitive to the interests in viewpoint diversity and against undue market concentration that underlies the Commission's multiple ownership rules. To ensure that arrangements actually lead to the promised interference reduction, we would require that applicants submit, along with their waiver requests, a contingent application for the major or minor facilities change needed to achieve the reduction.

58. We request comment on our tentative conclusion that relaxing the AM contour overlap rule for licensees agreeing to reduce interference to co-channel and adjacent channel stations would lead to the model AM operations we seek. We ask commenters concluding that such a relaxation would further our goals to discuss: (a) how much interference reduction we should require to merit waiver of the multiple ownership rule; (b) whether the number of square kilometers of contour overlap permitted should correspond to the number of square kilometers for which interference is reduced; and (c)

whether we should consider factors other than the number of square kilometers for which interference is reduced in deciding whether to permit such AM/AM combinations. Such additional factors would include effects on diversity and market concentration and might include: the classes of the stations involved; the extent of the overlap between their service contours; interference limitations in the signals of these stations; the relative audience shares or ratings of each; and how great would the costs be to applicants of making detailed proposals to reduce interference and to the Commission of reviewing such proposals. We also seek comment on the relative advantages and disadvantages of using the waiver process or an exception to our rules like that in place for overlapping television satellite stations to process requests for relaxing the contour overlap rule tied to interference reduction. Commenters should also address the implications of the simulcasting restriction.

59. *Possible Reimposition of AM - FM Nonduplication Rule.* Prior to 1964 there were no program duplication limits on co-owned AM and FM stations serving the same market. In that year the Commission began prohibiting FM stations from duplicating more than 50% of their programming from a co-owned AM station in the same local area.[31] The Commission had two objectives. The first was to foster development of the FM service by requiring separate programming of FM stations, which would encourage people to buy and use FM receivers. The second objective was to improve spectrum efficiency by reducing duplicate programming on two channels, both serving the same audience. In 1976 the Commission further limited the FM station in an AM-FM combination to not more than 25% duplication if either station served a community of more than 25,000 population.[32]

60. In 1986, citing three reasons for its action, the Commission deleted the program duplication rule in its entirety.[33] First, the rule's retention was no longer necessary for the purpose of promoting FM development. Second, its elimination could be expected to result in increased hours of operation since some stations in AM-FM combinations had shortened their broadcast day as one way to comply with the rule. Finally, its elimination would provide increased flexibility for licensees of AM-FM combinations to respond to economic forces, *i.e.*, by reducing operating costs for marginal AM stations.

61. The duplication of programming on two channels serving essentially the same audience can be an effective means of either assisting a fledgling service or propping up financially weak stations. However, its usefulness may be limited. Where established stations have experienced a steady decline in audience share and then resorted to program duplication as a way to reduce costs, we are not aware of any cases for which such measures have reversed the decline in audience share or established a permanent sound economic base. We request comment on the utility of program duplication as a means of aiding marginal broadcast operations.

62. We must also consider the fact that where a channel is licensed to a party for use at a particular location, other parties are prevented from using that channel and six adjacent channels at varying distances up to hundreds of kilometers. The licensed station will also cause an incremental increase in interference to other operating stations and will restrict the ability of other facilities to make modifications and improvements. Commenters are asked to address whether the preclusionary effect and the need to reduce interference in this context outweighs Commission policy as articulated in MM Docket No. 85-357.[34]

63. Given our objective of revitalizing the AM service by the year 2000 through the measures proposed in this *Notice*, we request comment on whether the continuation of program duplication will aid in or hinder the attainment of that objective. Parties favoring retention of our current policy should present data supporting the public interest and economic benefits of program duplication. Interested parties disfavoring the continuation of program duplication are requested to present proposals that, ideally, would provide incentives for the elimination of this practice on a voluntary basis. We also seek comment on what, if any, exceptions should be allowed if program duplication were to be precluded, such as, for example, where the amount of overlap of the AM and FM service areas is small.

VII. MIGRATION TO THE EXPANDED BAND

64. *Introduction.* The third prong of our master plan for improving the AM service calls for moving existing AM stations into the expanded band. This would meet two objectives: first, it would reduce interference and congestion in the existing AM broadcast service; and second, it would offer a prompt method for establishing service in the expanded band.

65. We are convinced that significant improvement in existing AM service depends on the willingness of stations causing heavy interference to migrate to the expanded band. We recognize that the decision to migrate to the expanded band would depend on a licensee's particular circumstances. Many existing stations use relatively uncomplicated antenna systems during daytime hours but switch to elaborate multi-tower systems for nighttime operation. For such licensees, the expanded band may present an attractive alternative to the frustrations and expenses associated with their existing operations and offer the opportunity for improved signal quality in a relatively noise free environment. We anticipate that most operations in the expanded band would require simple antenna systems and relatively small antenna sites. Some expanded band licensees may even choose to diplex at an existing tower site, requiring minimal site costs. As a result, many stations could profit significantly by moving to the expanded band and selling their existing real estate holdings which, in some cases, are valued in excess of station values. Also, a licensee may find migration a feasible alternative if the service area of an expanded band facility compares favorably with its existing operation.

66. Our definition of Model I service was created to provide for 25 to 30 stations per channel. We expect expanded band stations to be spaced relatively far apart in the heartlands but closer (by using directional antennas) along the coast and near urban areas. This would ensure licensees relatively large service areas with concomitantly low interference levels.

67. At the *en banc* hearing last November, some suggested that channels in the expanded band should be reserved for use by daytimers, minorities and public radio stations. Although the arguments for such reservations are not without merit, we believe that the most efficient and effective use of the expanded band is to resolve the interference problems of the existing band. The expanded band is limited to only ten channels. Were we to reserve one or

more channels for the exclusive use of daytimers, minorities or public radio stations, we would severely limit our ability to meet the pressing needs of the entire AM broadcast service. It is our belief that the reassignment of a station to the expanded band will benefit both that station and, by reducing interference and congestion, those stations remaining in the existing band. We have no reason to believe that our proposed approach will promote or disadvantage one segment of the industry more than others though we would consider any evidence to the contrary that commenters may provide. Recognizing that some short term discomfort may be necessary to restore the long term health and overall good of the service, we have endeavored to make our approach neutral and objective. Commenters may wish to address how set-asides could be reconciled with our goal.

68. *Travelers Information Stations.* The frequencies 530 and 1610 kHz are assigned in the Local Government Radio Service for the operation of Travelers Information Stations (TIS). These stations are used to transmit noncommercial voice information pertaining to traffic and road conditions, traffic hazard and travel advisories, rest stops and service stations, directions, availability of lodging and local points of interest. Local governments share these two frequencies with federal agencies providing similar services. TIS must be located at least 15 km outside the 0.5 mV/m daytime contour of any AM station operating on a first adjacent channel (540 or 1600 kHz). The field strength of a TIS must not exceed 2 mV/m at a distance of 60 meters from a cable antenna or 1.5 km from a vertical antenna.

69. In the *Third Notice of Inquiry* in Gen. Docket No. 84-467,[35] we suggested moving the TIS on 1610 kHz to 1700 kHz. We did not believe that TIS could provide effective service on 1610 kHz because of potential problems with future Canadian and Mexican stations operating on that channel and domestic broadcast operations on the upper adjacent channels of the existing AM band. Repeating this proposal, the subsequent *Fourth Notice of Inquiry* posed a series of questions regarding technical standards, protection and similar matters.[36]

70. When we proposed to move TIS to 1700 kHz, we were still anticipating that new AM stations, assigned in either the conventional manner or through an option described as "national licensing," would fill the expanded band. Because our goal was simply to devise an orderly and effective means for initiating new service and because we anticipated that the density of stations per channel would be greater than we now propose, we did not believe that exclusive allocation of one channel to TIS would materially affect the expansion of the AM service.

71. The master plan presented in this docket is based upon two premises radically different from those in earlier proceedings associated with improving the AM service. These premises are (1) that interference and congestion must be reduced and (2) that this reduction can be achieved only if existing stations migrate to the expanded band. While we appreciate the value of having a special service uniquely identified with its own channel, we do not believe that it justifies exclusive use of 10% of the expanded band's limited capacity, especially when the proposal we make today could offer TIS more opportunities for growth than would be achievable on a single channel.

72. Accordingly, we propose to modify Parts 2 and 90 to permit TIS to be assigned to any of the ten channels between 1605 and 1705 kHz. Because the density of broadcast stations will be comparatively low, with co-channel spacings ranging from 400 to 800 kilometers (249 to 497 miles), we believe that TIS will have greater opportunities for more stations, nationwide as well as in any given market, than would be possible with a single exclusive channel. Our proposal will permit TIS to easily avoid adjacent channel conflicts. Finally, this proposal may obviate the need for many existing TIS to vacate 1610 kHz. We seek comment on this and also on whether it is operationally feasible for TIS to be assigned to any of the existing channels between 535 and 1605 kHz.

73. Because TIS would be intermingled with broadcast stations, several issues relating to protection must be resolved. Toward this end, we seek comment on an appropriate co-channel separation standard. At the present time the rules provide that the transmitting site of a TIS must be located at least 15 km outside the 0.5 mV/m daytime contour of any broadcast station operating on the first adjacent channel. We seek such an administratively simple rule for co-channel separations. Also, in light of our proposal to increase the broadcasting adjacent channel protection ratio to 16 dB we seek information as to whether the current TIS standard should be modified.

74. The rules provide that TIS are authorized on a secondary basis to stations authorized on a primary basis in the band 1605-1705 kHz. Since broadcast stations will be authorized on a primary basis, we must determine how we will resolve incompatibilities where broadcast stations are assigned to markets where TIS are already operational. We pose three options:

> (1) A TIS must change frequency, at its own expense, if it is predicted to cause interference to a broadcast station. The change in frequency would not be required until the broadcast station became operational.
>
> (2) A TIS must change frequency, at its own expense, only if it causes actual interference to a broadcast station.
>
> (3) A TIS must change frequency if it is predicted to cause interference or if it causes actual interference to a broadcast station but only if the broadcast station bears the cost of the frequency change.

We seek comment on these options and on any other rules needed to ensure that TIS and broadcasting can effectively share the band.

75. *Eligibility.* We have tentatively concluded that the public interest will be served best by using the expanded band to improve the quality of AM service by lessening interference.[37] Because of severe congestion in the existing band that limits clear reception of many stations, we have tentatively concluded that, at least initially, the additional spectrum should not generally be open to new applicants. However, we contemplate that once the transition has been completed, new applicants may apply for unused capacity in the expanded band under the same rules and regulations governing other applicants for new AM stations.

76. We tentatively find that we can lawfully impose this temporary restriction on eligibility to apply for a frequency in the expanded band. In *Ashbacker* the Supreme

Court held that Section 309 of the Communications Act[38] requires the Commission to consider all mutually exclusive applications at the same time. It stated, however, that the Commission may define the class of eligible applicants.[39] Thus, the parties that must be afforded an opportunity for a comparative hearing are only those eligible under criteria established by the Commission. Subsequently, in *Storer Broadcasting*, the Supreme Court held that the Commission may by general rule establish eligibility standards prior to denial of an application.[40] We have limited or declined to consider competing applications in several other contexts when we found that this would promote the public interest.[41] Similarly, in this proceeding we propose to limit the initial class of eligible applicants to existing AM licensees. In light of the public interest benefits set forth above, defining the class of eligible applicants in this manner is consistent with *Ashbacker* and with those other proceedings in which we have limited the eligible class to those with specific characteristics. We seek comment on our tentative conclusions regarding eligibility criteria for a slot in the expanded band.

77. *Preferred Migrators*. Because we are unable to forecast the demand for migration to the expanded band, we must consider procedures to deal with a demand that may exceed the capacity. In developing such procedures, we focus our efforts on minimizing interference and maximizing high quality audio service. Since congestion in the existing band is the direct cause of most of the interference that has degraded AM service, we must conclude that there are too many stations in the existing AM band. If the heaviest contributors of interference migrated from the cluttered existing band to the now signal-free surroundings of the expanded band, the quality of the former could improve substantially. Thus, we believe that those existing licensees who by moving to the expanded band would most reduce interference and congestion should be preferred applicants for slots in that band.[42]

78. Several medium size cities in or adjacent to major metropolitan areas now lack a local fulltime aural station. This situation arose many years ago because of the dominance of nearby larger cities. These larger cities received all available AM and FM frequencies - the medium size cities were overlooked. The expanded band offers an opportunity to change this. We propose to consider ahead of all other daytime-only applicants, the applications of stations proposing to migrate to the expanded band that would also provide a first local fulltime aural service to cities with populations of 100,000 or more. Because the migration of these stations would not reduce nighttime interference in the existing band, we would consider these applicants only after our initial processing of all full-time station applicants.

79. *Options - Allotments or Assignments*. The method we now use to assign stations in the existing band would enable us to maximize the number of stations assigned to a single channel. This method would require each applicant to custom design its technical parameters like frequency, power and antenna systems to protect existing assignments. Another method would assign stations at predetermined distances with generally fixed technical parameters. The distance separating stations would depend upon the minimum service desired. Under the latter approach, specific channel allotments usually would be separated by prescribed distances and thus protected from interference. This approach would limit full use of channels compared to our assignment method. It would, however, offer several advantages over our present approach. First, most stations would, if anything, be better protected, assuring that each could offer its listeners a high quality, interference free service. Second, this system, by its nature, would give licensees flexibility in selecting antenna sites. Finally, this system would be relatively simple to administer, in part because it would avoid the "daisy chains" that could cause application processing to proceed at a glacial pace.

80. We tentatively find that the second method is more likely to produce the high quality service we seek for the expanded band. By making this band attractive to existing licensees, this method will also encourage migration and thus lead to an improved AM service in the existing band. For this reason we tentatively conclude that such a method is preferable to the traditional assignment method. We recognize, however, that because of the technical characteristics of the AM signal, AM broadcasting does not lend itself easily to such an approach. We also realize that the urban areas most likely to produce migraters are also likely to accommodate few allotments if we regularly space stations. For these reasons we tentatively conclude that a method incorporating flexible station separations would lead to optimal results in the expanded band.

81. *Sample Allotment Plan*. In order to demonstrate how we will develop a plan in response to migration demand, we will collect letters of intent from existing AM stations interested in migrating to the expanded band. Since the capacity of the expanded band is limited, we intend to rank stations based upon the qualitative improvement to the existing band which will result from the eventual deletion of these station's current assignments. This process would enable us to determine objectively how the potential areas should be established and the number of channels that we should allot to each area. We intend to group them by geographic area, including all interested stations within eighty kilometers of the worst interferers within the same area.

82. After ranking the stations, we would derive a sample allotment plan. First, we would evaluate the feasibility of using channels 1610, 1620 or 1630 in each area based upon our technical standards and applicable international agreements. The location of existing stations on channels 1580, 1590 and 1600, and an allotment area's proximity to international borders will determine the outcome of this evaluation. In order to provide high quality service in the expanded band, we would require all allotments in a sample plan to be at least 800 kilometers (497 miles) from the nearest co-channel allotment area, and 200 kilometers (124 miles) from the nearest adjacent-channel allotment area, except in Zone 1 (as shown in Figure 1 of section 73.699 of the Commission's Rules). There we would permit separations of 400 and 200 kilometers (249 and 124 miles), subject to the provision of adequate protection. We propose the reduced co-channel separation in Zone 1 because we anticipate a high demand for channels in this area, and with the understanding that licensees could use simple directional antennas to achieve desired protection levels. We propose the same adjacent-channel separations for all allotments, including those in Zone 1, because simple directional antennas could not give adjacent-channel skywave protection in addition to co-channel skywave protection.

83. After the first three channels have been considered, we would extend the draft allotment plan to cover use of channels 1640, 1650 and 1660, with reference to alloted use of 1610, 1620 and 1630 and with the same technical and separation requirements. At this time, potential allotment areas with the highest aggregate improvement factors would be considered for a second allotment. Finally the last four channels would be considered in the same way. We will publish the sample allotment plan when the *Report and Order* is issued in this proceeding; it would show a plan based on letters of intent only. The final plan would reflect actual petitions filed after this proceeding is concluded and would not necessarily coincide with the sample plan. We urge all interested parties to file nonbinding letters of intent. The sample plan will consider only letters of intent filed on or before **October 15, 1990.**

84. *Selection of Migrating Stations.* We propose to announce a filing window during which licensees of stations in the existing band would file petitions for authority to move to the expanded band.[43] Our initial examination of the petitions will determine whether more than one seeks to operate in the same area. If a petition is filed for a particular area and no competing petitions have been filed, that petitioner would be eligible to receive an allotment. If, however, a number of petitioners have filed for allotments in the same area and that number exceeds the number of available allotments, we will need selection criteria to choose among them.

85. Rather than using comparative evidentiary hearings,[44] we propose to rank petitioners based upon the extent to which the migration of each would improve service quality in the existing band.[45] Our proposed way to do this would be to rank them based upon the total magnitude of the interference attributable to each. This would grant the highest preference to those creating the heaviest interference, but not necessarily to those creating interference to the greatest number of stations.

86. A station contributes to the congestion of a given channel if it precludes other stations from modifying their facilities to achieve model AM service areas. The additional freedom for other stations to improve facilities if a congesting station migrated would be another measure of the extent to which a station's moving would improve service quality. To achieve our ultimate goal of establishing a model service area for as many stations as possible, we propose to rank stations seeking to migrate to the expanded band by using a composite measure that combines both ways of ranking the station.

87. The method used to rank stations must permit a comparison of stations that operate in the existing band on different channels and with different power levels. This calls for a ranking factor that reflects each station's unique operating situation. We propose such a ranking factor defined as the ratio of the nighttime interference caused by a station to the amount of nighttime service that station provides. We believe this ratio captures for each station the net effect on its channel of its migration. To determine the numerator of the ratio, we would first evaluate the coverage of each station to which the petitioner causes nighttime interference. The petitioner's interference would be excluded from the RSS calculation for each of the other stations and their expanded coverage areas would then be recomputed. The total of these area increases would be the numerator of the improvement ratio. The denominator of the ratio would be the nighttime interference-free area of the petitioner's station. These ratios, called "improvement factors", would be used to rank all stations in the AM band.[46] Frequency bias would be minimized since each ratio is normalized on the station's own channel before it is used to compare one station with another. We seek comment on our proposal for ranking stations entitled to a first preference, and in particular whether the factors we have identified are those most likely to assure improved service in the existing band.

88. The station with the highest ratio would be the one causing the greatest diminution of nighttime service to other stations relative to the amount of service it provides. Among all stations causing interference, this station would receive the highest ranking.

89. If no full-time station petitioned for a particular area, we would consider petitions from existing daytime-only stations. Among these petitioners, we propose to give first priority to stations located within the 0.5mV/m 50% contours of Class I stations and which are licensed to serve communities with populations of 100,000 or more that currently lack a local full time aural service. Second priority would go to other daytime-only stations that under the current rules cannot operate at night. Lastly, for the remaining daytime-only stations, the ranking would be based on permitted nighttime power calculated in accordance with current Section 73.182 of the rules in order of least to most. Again, we propose to apply these objective criteria without resort to comparative hearings.

90. We would require petitioners to support their request with sufficient technical information to enable us to determine how the station should be ranked. Unlike our present application process, no showing would be required for the proposed new operation; the technical exhibits would address only the petitioner's currently licensed station.[47] We would assume that all candidates would operate model I facilities, see paragraph 5, *supra*, unless restricted by international agreements. In its decision granting petitions, the Commission will specify the frequency to be used and any additional technical details that are pertinent, such as the need to operate at power levels departing from the 1 kW norm and/or use of directional antenna systems. To receive an assignment, successful petitioners would then be required to file within 60 days a complete application using FCC Form 301.

91. *Ownership Limitations and Transition Period.* Recognizing that the AM broadcast service has had declining revenues, profits, audience ratings, and station sale prices over the past several years,[48] we asked in the *Fourth Notice of Inquiry* whether the national ownership limits[49] or the local ownership restrictions should apply to expanded band stations.[50] We also asked whether we should waive these rules for any entity licensed in the expanded band for a five year (or longer) period of time.

92. Commenters addressing these issues agreed that there should be new ownership rules for the expanded band.[51] We agree with these commenters, that at least for a transitional period of time, we should permit individuals or entities to own and operate a commercial AM station in the existing band and one in the expanded band in the same area as long as the license for the existing band station would ultimately be surrendered. This could ultimately help reduce congestion and interference in the existing AM band and, at the same time, enable existing AM licensees to improve service quality by moving to the expanded band.

93. We cannot predict how quickly wideband receivers will become widely available. Nor can we forecast audience listening patterns or potential advertising revenues for stations operating in the expanded band. These uncertainties make operation in that band a financially risky undertaking. For this reason we propose to add a note to the multiple ownership rules to permit, without waiver request or other public interest showing, the simultaneous ownership and operation of an expanded band and an existing band station in the same area for a transitional period of time. At the end of this period, operation in the existing band would no longer be authorized. Because joint ownership will only be permitted for a transition period and because the number of radios capable of receiving stations in the expanded band will, at first, be small, we also propose to allow a licensee to duplicate without limit on the expanded band channel the programming carried over its existing AM band channel. We seek comment on our proposal to adopt a new note to the multiple ownership rules permitting the simultaneous ownership and operation of a commercial AM station in the 535-1605 kHz band and a commercial AM station in the expanded band with overlapping 5 mV/m contours, for a transitional period of time, after which the existing band station would be surrendered. We also seek comment on the length of this transitional period; should it be linked to the penetration of fullband receivers locally, regionally, or nationally? We also seek comment on our proposal to permit unlimited program duplication between the existing and the expanded band.

94. We also propose a note to our national ownership rule to permit an existing AM licensee to own and operate an expanded band station during this transitional period even if this gives the licensee a cognizable ownership interest in excess of our national ownership limits. We seek comment on how the national ownership rule should treat a licensee owning the maximum number of AM stations permitted by our national ownership rules that seeks to construct a station in the expanded band. Our preliminary view is that we should establish this limited exception to the national ownership rules for a transitional period of time since this would facilitate the development of the expanded band.

95. We propose that following construction, the permittee would apply for a license to operate the expanded band station and, if all the terms of the construction permit have been met, a license for that facility would issue. The license would issue, however, conditional on the eventual surrender of the existing band license. During the interim we would prohibit the licensee from operating on one of its authorized frequencies and selling its operation on the other frequency. If a station is authorized to move to the expanded band, and later decides to operate on only its former frequency, we would require it to surrender its expanded band authorization and its allotment would be made available to other eligible applicants. Once a station is licensed to operate in the expanded band and the transition period has expired, the existing band station would go silent; new petitioners for its former existing band frequency would then have to meet the standards in effect at the time of their filing. They would not "inherit" the previous station's radiation rights.

VIII. RECEIVER MODEL

96. We believe that this document is an appropriate forum for comments on the characteristics of a model AM receiver. We must continually make several assumptions about average receiver performance as we develop allotment and assignment criteria. Rather than attempt to base these criteria on the widely varying characteristics of actual receivers which change from year to year, we believe the service would benefit if we settled on a single hypothetical model possessing desirable and yet affordable performance attributes. We note that the National Association of Broadcasters and the Electronic Industry Association are refining the specifications they have developed for a high quality AM radio. We believe that their work and our adoption of a "reference" model will induce manufacturers to make a significant improvement in the performance of AM tuners. We are convinced that, as the service improves, good quality, wideband receivers will become common. By "good quality" we mean receivers with a standardized frequency response that complements the broadcast audio preemphasis limitation defined in NRSC-1.[52] These receivers would also reject frequencies outside the bandwidth of the transmitted signal to which they are tuned. Generally, giving licensees protection from adjacent channel interference should encourage manufacturers to make and consumers to buy wideband receivers. These radios should improve the quality of the AM signal reaching a listener's ear and thus enhance AM broadcasters' ability to compete.

97. We propose to use as our planning assumptions the draft recommendation of the National Radio Systems Committee. We intend to treat them as recommendations to the receiver industry, *not* requirements. Few commenters to the *Inquiry* believed that we should establish mandatory receiver standards. Although we have heard of many creative and worthwhile improvements, we are also aware that they embody tradeoffs among features, performance and cost. Attempts to incorporate these in compulsory standards would reduce choices and raise prices. Consequently, we agree with the majority that there is now no reason for such standards and we do not intend to mandate receiver standards.

98. Use of the NRSC-2 emission limitation will reduce the occupied RF bandwidth of AM broadcast transmitters from 30 kHz to a nominal 20 kHz, leading to a reduction in adjacent channel interference levels and to improved reception quality for the AM service.[53] After we adopted the NRSC-2 emission standard, the NRSC developed, and circulated for approval, a proposed set of AM receiver technical parameters.[54] While the NRSC has not yet given final approval to it, the draft proposal calls for receivers of substantially higher quality than those available today. We seek comment on whether the NRSC proposal is a complete and acceptable standard for our purposes. Are there other requirements that we should assume? For example, should we assume that receivers can select, automatically or manually, between wideband and narrowband transmission so that skywave service is protected from adjacent channel interference? If so, should characteristics of the narrowband operation also be specified? Would it be desirable to include recommendations that do not directly relate to interference protection criteria, such as that all receivers with FM stereo capability should also have AM stereo capability? What assumptions are valid regarding industry implementation of the draft NRSC standards and the transition to wideband receivers?

99. We are considering developing a list of those receivers that satisfy the minimum criteria needed for the good quality receiver discussed above. We propose that such a list be updated and released as a public notice every six months. The intent of this list would be to help all parties identify those receivers with technical characteristics complementing the improved transmissions we are working to achieve.

IX. OTHER MATTERS

100. In a *Petition For Rule Making* filed February 2, 1989, Crawford Broadcasting Co., requests changes to Section 73.182 of the rules regarding protection of Class I stations. Specifically, Crawford proposes that we: (1) eliminate consideration of secondary service, (2) adopt a protected contour of 2.0 mV/m groundwave, and (3) use 50% skywave curves for interference calculations. In a *Petition for Rule Making* filed May 9, 1989, Lloyd B. Roach, Inc., proposes changes to the post-sunset authority rules, Section 73.99, to allow fulltime Class III stations their authorized pre-sunrise power level during the period between local sunset and 6:00 p.m. Both of these proposals, in essence, request a relaxation in interference protection standards and would, if adopted, cause increased levels of interference to numerous AM stations resulting in a general reduction in existing service in the AM band. Since this is inconsistent with the major theme of this proceeding, interference reduction, we will dismiss the instant petitions. Any comments these petitioners wish to file in this proceeding will be fully considered by the Commission.

101. In addition to proposing rules covering the subjects discussed herein, we believe a general revision of the AM rules is appropriate at this time. Therefore, some of the rules proposed in Appendix 5 relate to subjects not discussed in this proceeding but which, if adopted, would update, correct or clarify the current rules. In view of this, we welcome comments and suggestions on any other changes to the rules that would produce an improved version of the AM rules.

102. The impetus for these changes has come from many sources. In general, the proposed rules which involve modifications of existing procedure reflect the implementation of practices which are currently in use and in effect have already superseded the printed requirements. The need for such changes has been brought to our attention over time by broadcasters and their representatives, as well as by members of the Commission staff who deal with the daily administration of broadcasting functions. Two examples of this process can be seen in the changes proposed for Sections 73.150 and 73.152. Computerized methods in the area of directional antenna pattern calculation have dramatically reduced the amount of documentation needed in the application filing process. In reality much of the paperwork required for submission under Section 73.150 has not been demanded by the staff for many years. This fact and others are the subject of a Petition for Rule Making filed by Karl D. Lahm on April 28, 1989. In light of the above, several of Mr. Lahm's recommendations have been incorporated in the new text of Section 73.150 in Appendix 5.

103. The current language in Section 73.152 lacks sufficient specific directions regarding the filing of directional antenna augmentation applications. This has resulted in a set of instructions which the Commission staff has used internally and has over the years evolved into a policy. These guidelines are now included in the text of Section 73.152 to help reduce the number of amendments that must now be requested from applicants who initially seek excessively high levels of augmented radiation that are not consistent with our primary goal of maintaining spectrum efficiency. Further on the subject of pattern augmentation, we seek comment on the need to extend this procedure to directional antennas for stations that will operate in the frequency range 1605 to 1705 kHz. With the tendency toward the use of simple arrays along with the proposed reduced proof requirements for stations in this band, sufficient latitude may already be included to warrant the elimination of this added variable from directional pattern adjustment practices.

104. A number of changes are required to Part 2, Table of Frequency Allocations, Section 2.106 of the Rules[55] and to Part 90 of the Rules to implement the AM band expansion and to make new provisions for Travelers Information Stations (TIS) as proposed herein. They are also shown in Appendix 5 and generally reflect our proposals to use the expanded band for broadcast operations, to permit TIS to operate on any expanded band frequency, and to allow for continued operation of non-broadcast stations provided interference is not caused to broadcast stations.

105. On March 29, 1990, we released an *Order* [56] that curtailed the filing of most applications for new or changed facilities. That action was taken so as to avoid compounding present difficulties with a continuing flow of applications based upon existing, possibly inadequate, standards. The *Order* included interim procedures that identified limited categories of applications which could continue to be filed. We believe that those procedures should be effective as long as this proceeding is open.

X. SUMMARY AND CONCLUSION

106. In this *Notice*, we have outlined our three-pronged attack on the problems confronting the existing AM service. We have proposed changes to our technical standards, changes to some non-technical requirements, and have described our planned use of the expanded band. Such a combined approach, we believe, is necessary to improve the AM service. This proceeding covers a wide range of issues with no simple answers. We request comments on the issues and proposals addressed in this *Notice* and encourage full participation of station licensees, their engineering and legal representatives and receiver manufacturers. The comments should specifically address the issues identified herein. We will, however, consider all relevant comments regarding improvement of the AM service.

XI. ADMINISTRATIVE MATTERS

107. As required by Section 603 of the Regulatory Flexibility Act, the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the expected impact on small entities of the proposals suggested in this document. The IRFA is set forth in Appendix 6. Written public comments are requested on the IRFA. These comments must be filed in accordance with the same filing deadlines as comments on the rest of the Notice, but they must have a separate and distinct heading designating them as responses to the Initial Regulatory Flexibility

Analysis. The Secretary shall send a copy of this Notice of Proposed Rule Making, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration in accordance with paragraph 603(a) of the Regulatory Flexibility Act, Pub. L. No. 96-354, 94 Stat. 1164, 5 U.S.C. Section 601 *et seq.* (1981).

108. The proposal contained herein has been analyzed with respect to the Paperwork Reduction Act of 1980, and found to impose a new or modified information collection requirement on the public. Implementation of any new or modified requirement will be subject to approval by the Office of Management and Budget as prescribed by the Act.

109. For purposes of this non-restricted notice and comment rule making proceeding, members of the public are advised that *ex parte* presentations are permitted except during the Sunshine Agenda period. *See generally* 47 CFR 1.1206(a). The Sunshine Agenda period is the period of time which commences with the release of a public notice that a matter has been placed on the Sunshine Agenda, and terminates when the Commission (1) releases the text of a decision or order in the matter; (2) issues a public notice stating that the matter has been deleted from the Sunshine Agenda; or (3) issues a public notice stating that the matter has been returned to the staff for further consideration, whichever occurs first. Section 1.1202(f). During the Sunshine Agenda period, no presentations, *ex parte* or otherwise, are permitted unless specifically requested by the Commission or staff for the clarification or adduction of evidence or the resolution of issues in the proceeding. Section 1.1203.

110. In general, an *ex parte* presentation is any presentation directed to the merits or outcome of the proceeding made to decision-making personnel which (1) if written, is not served on the parties to the proceeding, or (2) if oral, is made without advance notice to the parties to the proceeding and without opportunity for them to be present. Section 1.1202(b). Any person who makes or submits a written *ex parte* presentation must provide, on the same day it is submitted, two copies of same under separate cover to the Commission's Secretary for inclusion in the public record. The presentation (as well as any transmittal letter) must clearly indicate on its face the docket number of the particular proceeding(s) to which it relates and the fact that two copies of it have been submitted to the Secretary and must be labeled or captioned as an *ex parte* presentation.

111. Any person who in making an oral *ex parte* presentation presents data or arguments not already reflected in that person's written comments, memoranda, or other previous filings in that proceeding shall provide, on the day of the oral presentation, an original and one copy of a written memorandum to the Secretary (with a copy to the Commissioner or staff member involved) which summarizes the data and arguments. The memorandum (as well as any transmittal letter) must clearly indicate on its face the docket number of the particular proceeding and the fact that an original and one copy of it have been submitted to the Secretary, and must be labeled or captioned as an *ex parte* presentation. Section 1.1206.

112. Pursuant to applicable procedures set forth in Sections 1.415 and 1.419 of the Commission's Rules, interested parties may file comments on or before **October 15, 1990,** and reply comments on or before **November 14, 1990.** All relevant and timely comments will be considered by the Commission before final action is taken in this proceeding. To file formally in this proceeding, participants must file an original and four copies of all comments, reply comments, and supporting comments. If participants want each Commissioner to receive a personal copy of their comments, an original plus nine copies must be filed. Comments and reply comments should be sent to the Office of the Secretary, Federal Communications Commission, Washington, D.C. 20554. Comments and reply comments will be available for public inspection during regular business hours in the Dockets Reference Room (Room 239) of the Federal Communications Commission, 1919 M Street, N.W., Washington, D.C. 20554.

113. Authority for the actions proposed above is contained in Section 4(i) and 303 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i) and 303.

114. For further information on this proceeding, contact William H. Hassinger, Mass Media Bureau, (202) 632-6460, or Larry W. Olson, Policy and Rules Division, Mass Media Bureau, (202) 632-6955.

XII. ORDERING CLAUSES

115. IT IS ORDERED, That, pursuant to §5(c)(1) of the Communications Act as amended, 47 U.S.C. §155(c)(1), and §0.201(d)(2) of the Commission's rules, 47 C.F.R. §0.201(d)(2), the Mass Media Bureau shall prepare and the Bureau Chief shall sign orders terminating MM Docket No. 88-376, MM Docket No. 88-509 and MM Docket No. 88-511.

116. IT IS FURTHER ORDERED, That, pursuant to §4(i) of the Communications Act as amended, 47 U.S.C. §154(i), and §1.401(e) of the Commission's rules, 47 C.F.R. §1.401(e), the Petitions for Rule Making filed by Crawford Broadcasting, Co., and Lloyd B. Roach, Inc. ARE DISMISSED.

FEDERAL COMMUNICATIONS COMMISSION

Donna R. Searcy
Secretary

FOOTNOTES

[1] *Final Acts of the Regional Administrative Radio Conference to Establish a Plan for the Broadcasting Service in the Band 1605-1705 kHz in Region 2, Rio de Janeiro, 1988.*

[2] *See Report and Order*, MM Docket No. 89-46, FCC 90-139 (adopted April 12, 1990).

[3] *See Report on the Status of the AM Broadcast Rules*, RM-5532 *(Report)*.

[4] *See Review of Technical Assignment Criteria for the AM Broadcast Service*, MM Docket No. 87-267, 2 FCC Rcd 5014 (1987).

[5] *See Improved Methods for Calculating Skywave Field Strength in the AM Broadcast Band*, MM Docket No. 88-508, 3 FCC Rcd 6431 (1988); *Enhanced Nighttime Operation for Class II-S and Class III-S AM Stations*, MM Docket No. 88-509, 3 FCC Rcd 6444 (1988); *Improved Methods for Calculating Groundwave Field Strength in the AM Broadcast Band*, MM Docket No. 88-510, 3

FCC Rcd 6577 (1988); *Review of the Methods for Calculating Nighttime Protection for Stations in the AM Broadcast Service,* MM Docket No. 88-511, 3 FCC Rcd 6448 (1988); and, *Amendment of the Commission's Rules to Improve the Quality of the AM Broadcast Service by Reducing Adjacent Channel Interference and by Eliminating Restrictions Pertaining to the Protected Daytime Contour,* MM Docket No. 88-376, 3 FCC Rcd 5687 (1988).

[6] *See Policies to Encourage Interference Reduction Between AM Broadcast Stations,* MM Docket No. 89-46, 4 FCC Rcd 2430 (1989).

[7] Prior to the Conference's completion, the Commission adopted a *Fourth Notice of Inquiry* to expedite domestic implementation. In it, we posed important technical and procedural questions relating to: national licensing; eligibility criteria; technical criteria; processing procedures; and travelers information stations (TIS). *See Preparation for an International Telecommunication Union Region 2 Administrative Radio Conference for the Planning of Broadcasting in the 1605-1705 kHz Band,* General Docket No. 84-467, 3 FCC Rcd 2345 (1988). We treat relevant domestic issues associated with the expanded band in this proceeding. We will keep Gen. Docket No 84-467 open so that we can consider there any remaining international matters. The first three notices and reports were in preparation for the two sessions of the RARC, *see First Notice of Inquiry,* 49 Fed. Reg. 21419 (May 21, 1984); *First Report,* 50 Fed. Reg. 33844 (August 21, 1985); *Second Notice of Inquiry,* 50 Fed. Reg. 2077 (January 15, 1985); *Second Report,* 51 Fed. Reg. 8706 (March 13, 1986); *Third Notice of Inquiry,* 2 FCC Rcd 4295 (1987); and *Third Report,* 3 FCC Rcd 2345 (1988).

[8] The U.S. was alloted 1660, 1680 and 1700 kHz in southern Florida, 1620 and 1690 kHz in the Virgin Islands, and 1660 kHz in Puerto Rico.

[9] We are currently negotiating with Canada and Mexico regarding border area use of the expanded band. Our goal is to develop agreements preserving flexibility for our domestic decisions and minimizing the need to coordinate proposals.

[10] A standard station was defined as a fulltime station with power of 1 kW and a 90 degree omnidirectional antenna. Nonstandard powers up to 10 kW were permissible if other administrations were accorded protection equivalent to that given by a standard station.

[11] *See Report and Order,* MM Docket No. 88-508, FCC 90-137 (adopted April 12, 1990).

[12] *See Report and Order,* MM Docket No. 88-510, FCC 90-138 (adopted April 12, 1990).

[13] *Report and Order, supra* n. 2.

[14] *See Amendment of the Commission's Rules to Improve the Quality of the AM Broadcast Service by Reducing Adjacent Channel Interference and by Eliminating Restrictions Pertaining to the Protected Daytime Contour,* MM Docket No. 88-376, 4 FCC Rcd 3835 (1989); *recon denied,* 5 FCC Rcd 2598 (1990).

[15] The value of E_{min} represents the minimum field strength necessary to permit a desired reception quality in the presence of atmospheric and man-made noise.

[16] Atmospheric noise is created mainly by lightning discharges in thunderstorms. Man-made noise, found mainly in populous areas, arises from sources such as power lines, industrial machinery, ignition systems and appliances.

[17] *See First Report and Order,* Docket 87-389, 4 FCC Rcd 3493 (1989).

[18] *See Order Granting Limited Waiver,* FCC 83-361, released August 5, 1983, para. 20. *See also Third Report and Order,* Docket 20718, 50 FR 36061 (1985) and Erratum, Docket 20718, released August 29, 1985.

[19] *See Notice of Proposed Rule Making,* Docket 83-806, 51 FR 18004 (1986).

[20] *See Report and Order,* Docket 83-806, 2 FCC Rcd 6775 para. 10 (1987).

[21] *See* Comments of NAB on Sections I and IV of the *Notice of Inquiry in* MM Docket No. 87-267, Appendices A and B. Appendix A is the *Klein Study* and Appendix B is the *Angell Report.*

[22] Appendix 1 illustrates the effects of this proposal.

[23] The protection ratios used for this purpose would be 26 dB (co-channel) and 16 dB (first adjacent channel).

[24] The protection ratios used for this purpose would be 26 dB (co-channel) and 0 dB (first adjacent channel).

[25] Appendix 2 illustrates the effects of this proposal.

[26] Adoption of these proposals depends upon elimination of international restrictions and final action on our proposal regarding nighttime interference calculations. *See* paragraphs 38-41, *supra.*

[27] Thus, we propose that AM stations in the expanded band meet a minimum efficiency requirement of 282 mV/m at one km; use a quarter wave ground system; exhibit the antenna radiation characteristics of Figures 5 and 8, Section 73.190 of the rules; meet a one ohm loss resistance for directional antenna systems; and satisfy blanketing interference requirements.

[28] *See* Comments of Westinghouse Broadcasting Company, Inc., filed in MM Docket No. 89-46.

[29] *See Second Report and Order* in Amendment of Part 74 of the Commission's Rules and Regulations in regard to the Instructional Television Fixed Service, MM Docket No. 83-523, 101 FCC 2d 49 (1985), *on recon.*, 59 RR 2d (P & F) 1355 *(1986), remanded on other grounds sub nom. Telecommunications Research and Action Center,* 836 F. 2d 1349 (D.C. Cir. 1988), *Order and Second Further Notice of Proposed Rule Making* in MM Docket No. 83-523, 3 FCC Rcd 4564 (1988).

[30] An individual has a cognizable interest in a broadcast station if the individual is an officer, director, partner or owner of 5% or more of the voting stock of the station. *See* 47 C.F.R. § 73.3555, Notes 1 and 2.

[31] *See Report and Order* in Docket No. 15084, 45 FCC 1515 (1964).

[32] *See Report and Order* in Docket No. 20016, 59 FCC 2d 147 (1976).

[33] *See Report and Order* in MM Docket No. 85-357, 59 RR 2d 1611 (1986).

[34] As part of the record in this proceeding on this issue we intend to include the petition for rule making filed by Earl J. Weinreb on May 25, 1989 in which he requested that the Commission reimpose its AM-FM nonduplication rule.

[35] 2 FCC Rcd 4295 (1987), *see supra* n. 7.

[36] 3 FCC Rcd 4497 (1988), *see supra* n. 7.

[37] Consequently, we are abandoning the proposal for national licensing of the expanded band presented in the *Fourth Notice of Inquiry* in Gen. Docket No. 84-467. *See* n. 7, *supra.*

[38] 47 U.S.C. §309 (1988).

[39] *Ashbacker Radio Corp. v. F.C.C.*, 326 U.S. 327, 333 n.9 (1945).

[40] *United States v. Storer Broadcasting Co.,* 315 U.S. 192 (1956).

[41] *See, e.g., Amendment of the Commission's Rules Regarding Modification of FM and TV Authorizations to Specify a New Community of License,* 4 FCC Rcd 4870 (1989); *Second Report and Order,* Gen. Docket No. 82-243, 4 FCC Rcd 2012 (1989).

[42] Because of the high density of Class IV stations on local channels, we believe that relatively little improvement would result if they were permitted to migrate. Accordingly, we propose initially to restrict Class IV stations from migrating to the expanded band.

[43] Since these petitions would be the initial step used by the Commission to identify and rank stations proposing to migrate, the information required to be filed would be limited to an accurate description of the existing band station (call sign, location and frequency) and the information necessary to rank the station (interference caused and service rendered).

[44] *See para. 56, supra.*

[45] Appendix 3 is a sample channel study - "AM Interference Improvement on a Sample Channel as a Result of a Random Migration Process".

[46] Appendix 4 demonstrates the application of this improvement factor showing results on a sample channel.

[47] *See* n. 43, *supra.*

[48] *See* Appendix 1 of the *Report on the Status of AM Broadcast Rules,* Mass Media Bureau Staff, April 3, 1986.

[49] *See* 47 C.F.R. § 73.3555(d). This rule generally prohibits cognizable ownership interests in more than 12 commerical AM stations.

[50] *See* 47 C.F.R. Section 73.3555(a) which currently prohibits an attributable ownership interest in two or more commercial AM stations if their predicted or measured 5 mV/m groundwave contours overlap.

[51] *See* Comments of NAB at 15-19; Comments of ABES at 17-18, Comments of Bonneville International Corporation at 7; and Comments of CBS at 9-11.

[52] *See* National Radio Systems Committee, NRSC-1 AM Preemphasis/Deemphasis and Broadcast Audio Transmission Bandwidth Specifications (ANSI/EIA-549-1988).

[53] Being greater than the separation of 10 kHz separating them, adjacent channel's transmitter bandwidths overlap. Reducing bandwidth will reduce that overlap, thus improving reception quality.

[54] *See* "Proposal for a Voluntary National Standard, Performance Recomendations for AM Broadcast Receivers," dated January 9, 1990 and circulated for publication approval on January 22, 1990. A copy has been placed in the Docket file.

[55] 47 C.F.R. §2.106.

[56] 5 FCC Rcd 2136 (1990).

SEPARATE STATEMENT OF COMMISSIONER ANDREW C. BARRETT

Re: Review of the Technical Assignment Criteria for the AM Broadcast Service MM Docket No. 87-267

I applaud the Commission's efforts to improve the AM radio service. Like most people of my generation, I grew up listening to AM radio as it entertained and informed me of events in my community and around the world. I understand the problems this service faces. These concerns were made all the more apparent during an all day En Banc hearing on AM improvement. I listened intently as some of those concerned with the fate of AM explained the steps that needed to be taken to assist in AM radio's survival. I fully support the policy goals enunciated in this Notice of Proposed Rule Making of transforming and revitalizing the AM radio service.

I write separately to voice my concerns over the allocation of channels on the expanded AM band (1605-1705 kHz). I understand the desire to remove interference and congestion from the existing AM band. However, the cure for AM may be the denial of opportunity for new entrants, including minorities, women and public broadcasters. I am concerned particularly about the plight of new minority broadcasters who could assist in adding to the level of diversity in broadcasting. Currently, minorities own only about 3 percent of the approximately 11,000 broadcast stations in this country. There is a need to ensure that minorities are not precluded from ownership opportunities as this Commission allocates new spectrum.

I recognize that through our actions today some existing minority and female broadcast station owners will be able to trade up to technically better facilities on the expanded AM band. This reality makes the denial of new entry for these groups more palatable. Yet, I also would hope that this Commission would continue to look favorably upon providing opportunities for minorities, women and those proposing non-commercial public radio on the expanded AM band in situations where (1) no broadcasters in the existing AM band request the allocation or (2) where none of the stations requesting the allocation would, in fact, reduce the interference or congestion on the existing AM band. Such a scheme would appear consistent with our efforts to improve AM radio. Moreover, it would assist us in accomplishing our long held goal of diversity of programming through media ownership.

Appendix 1

Proposed Changes in Daytime First Adjacent Channel Protection Standards

Protection ratios are used in conjunction with protected contours to determine the service and interference relationships between stations. The value of the protection ratio varies depending on the frequency relationship of the stations involved. In the case of stations separated by one channel, i.e., first adjacent channel, the current rules apply a value of 0 dB while the proposed rules specify a value of 16 dB. The significance of such a change in values is related to the contours that would be considered as "interfering". Using a protected contour of 0.5 mV/m, the interfering contour would be 0.5 mV/m for the current rules and 0.079 mV/m for the proposed rules.

Such a change in the protection ratio would, in effect, extend the distance to a station's interfering contour, thereby resulting in the depiction of interference where presently no interference is predicted. To demonstrate the effects of this change, Exhibit 1.1 shows the service and interference relationship of four stations. The subject station, KZIM, Cape Girardeau, MO (960 kHz) is located relatively close to first adjacent channel stations WMAY, Springfield, MO (970 kHz), KLIK, Jefferson City, MO (950 kHz) and KNEA, Jonesboro, AR (970 kHz). Note that under the present first adjacent channel standard, the revelant contours (0.5 mV/m) of the stations are no worse than tangential and that no interference to KZIM is predicted. However, when the protection standard is changed from 0 dB to 16 dB, a considerable area of interference to KZIM results (shown as cross-hatched areas).

As these stations are licensed entities, such an illustration is only useful to show the existence of interference in areas where licensees may have thought service was being provided. The proposed rules would not require existing stations to make modifications to correct these interference situations that have been identified based on a more accurate value of the protection ratio. However, the real benefit from these changes would be manifest where existing service is further protected from incursions which may come from proposals for new stations and increases in existing operations that would be allowed under the current standards. Finally, licensees may use this new information to identify areas under interference which may be the subject of future agreements to improve their service.

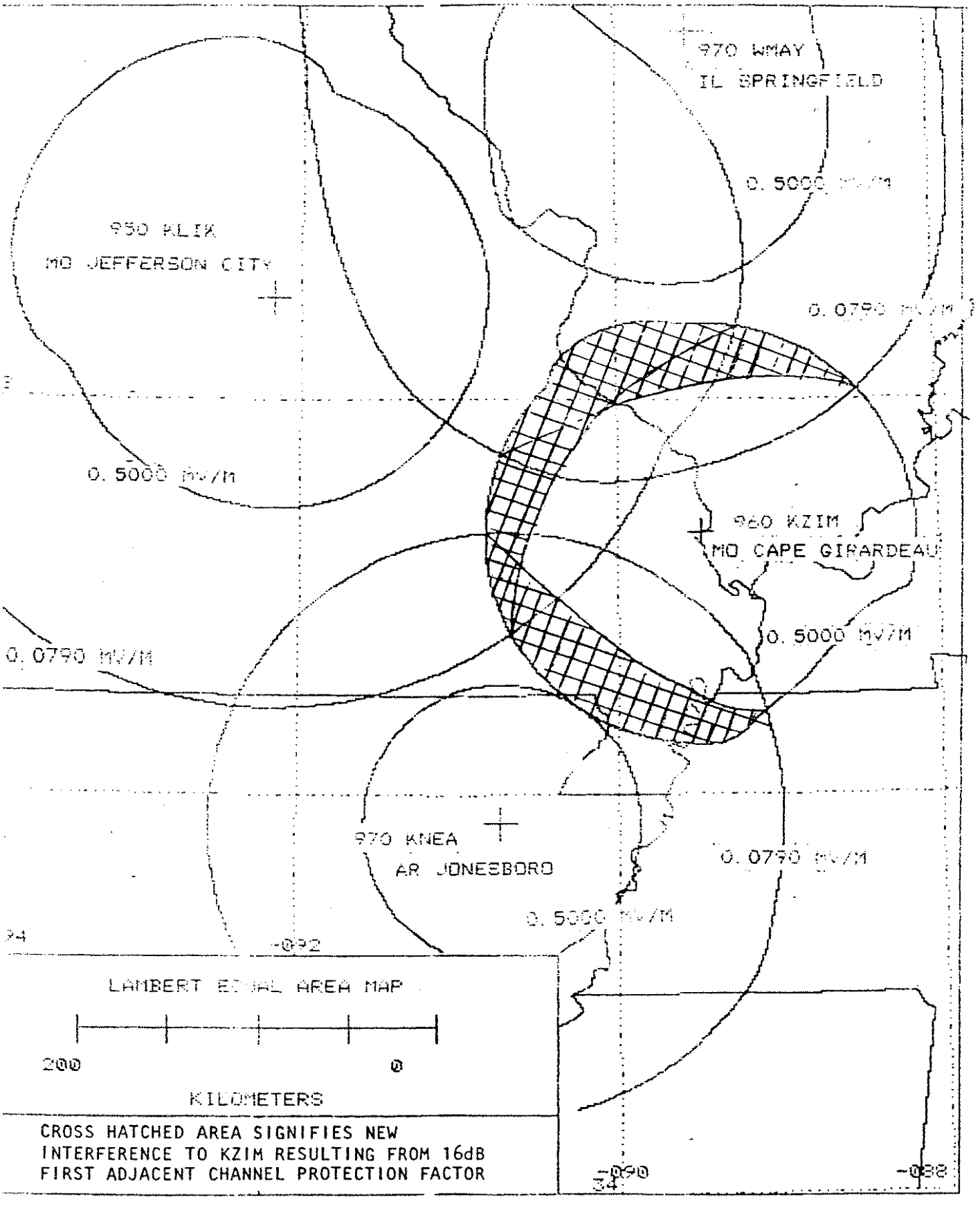
970 WMAY
IL SPRINGFIELD
0.5000 MV/M
950 KLIX
MO JEFFERSON CITY
0.0790 MV/M
0.5000 MV/M
960 KZIM
MO CAPE GIRARDEAU
0.5000 MV/M
0.0790 MV/M
970 KNEA
AR JONESBORO
0.0790 MV/M
0.5000 MV/M
LAMBERT EQUAL AREA MAP
200
0
KILOMETERS
CROSS HATCHED AREA SIGNIFIES NEW
INTERFERENCE TO KZIM RESULTING FROM 16dB
FIRST ADJACENT CHANNEL PROTECTION FACTOR

EXHIBIT 1.1

Appendix 2

Effects of Proposed Standards on AM Nighttime Operations

This proceeding proposes numerous revisions to the standards and methods we currently use to authorize new or modified AM nighttime operations. The effects of the proposed changes on AM stations relate to either service area calculations or interference protection requirements. It is believed that implementation of these changes would result in a more accurate depiction of nighttime service and interference and would require applicants to provide greater interference protection to existing stations.

To illustrate the effects of these changes, nighttime limits of stations on a sample frequency, 600 kHz, were calculated using our current rules (existing skywave curves, 50% exclusion and no consideration of first adjacent channel skywave interference) and our proposed rules (new skywave model, no exclusion, and a 16 db protection ratio for first adjacent channel skywave interference protection). A nighttime limit is the value of field strength of the desired signal necessary to overcome interfering signals from other undesired stations. Interference-free service is obtained within the contour determined by that nighttime limit. The higher the limit, the smaller the interference-free service area.

The Commission's current database was used as a basis for the calculations. Although the data may contain inconsistencies or errors originating from sources such as unstudied foreign notifications, their use appears reasonable for the purposes of this study. To show the relative locations and radiation characteristics of stations considered in this study, the attached maps (Exhibits 2.1, 2.2 and 2.3) indicate the location of nighttime stations on the sample frequency (600 kHz) as well as those on the first adjacent channels (590 and 610 kHz).

Table I shows the individual calculated nighttime limits imposed on KCLS from each of 94 interference sources and the "running" RSS which is computed as each new limit is considered. Twenty-six of those limits are from stations operating on KCLS's frequency; the remainder are those on 590 and 610 kHz. Since the current rules disregard adjacent channel signals, the calculated limits for stations 27 to 94 are zero as shown in the limit column. Note that the RSS in the current rules column is 11.0665 and remains unchanged regardless of the existence of additional signals from other stations. This is because the signal levels for stations 2 to 94 are less than 50% of the signal from station 1 and are therefore disregarded under our current RSS procedure. Data for stations 36 thru 93 were omitted since they have little or no effect on KCLS. The right hand columns are based on the proposed rules in which no signals are omitted. Note that the proposed method includes contributions from first adjacent channel stations.

Table II is a comparison of RSS nighttime limitation values for fulltime U.S. stations on 600 kHz and was compiled from calculations similar to Table I for the fifteen U.S. nighttime stations on 600 kHz. The current and proposed RSS are those derived from line 94 of Table I for each set of calculations. These RSS values are used to describe the interference-free service area of a station and, in general, are higher under the proposed standards. Root sum squared (RSS) values are computed for each station using, first, the present standards and then, the proposed standards. Resultant coverage areas are given along with the RSS values. The RSS values obtained using the proposed rules are a more accurate depiction of the actual coverage provided by the listed stations.

Table III compares the protection afforded KCLS under the current rules and the proposed rules. The table identifies stations and their limits to KCLS. Also shown is the channel relationship with KCLS. For instance, station KKLQ operates on the same channel (indicated by a zero in the Ch column) as KCLS and causes a limit of 11.07 mV/m to KCLS. This is the highest limit to KCLS and thus becomes the first limit in the KCLS RSS. Using the current 50% exclusion method, the next permissible limit would be 5.53 mV/m (11.07/2). Since the KKLQ limit is already included in KCLS's RSS, KKLQ would not be permitted to increase radiation in the direction of KCLS. This is shown by the 0.00 in the Increase Allowed column. Under the proposed rules, the KKLQ limit to KCLS is 10.71 mV/m which exceeds the permissible limit of 1.00 mV/m. Thus, KKLQ would be required to reduce its radiation by 10% towards KCLS if future modifications were made.

Table IV illustrates the effects of the new standards on the flexibility of KCLS. The table identifies the limits KCLS causes to other stations. The information is similar to that shown in Table III except that columns including bearing (Az.) and distance (Dist.) from KCLS are provided to aid in evaluating the restrictions on KCLS. For instance, KCLS operates on the next higher channel (indicated by a + in the Ch column) as KOJM and causes a limit of 0.00 mV/m to KOJM under the present rules which do not consider adjacent channel operations. The 50% RSS nighttime limitation of KOJM is 10.32 mV/m, giving a permissible limit of 5.16 mV/m. Under the current rules, KCLS is not restricted from increasing radiation towards KOJM. Under the proposed rules, the KCLS limit to KOJM is 0.4. mV/m, permitting an increase in radiation towards KOJM of 2.5 times its present value.

Table I

Interference (Limits) to KCLS

Current Rules				Proposed Rules			
#	Call	Limit (mV/m)	RSS (mV/m)	#	Call	Limit (mV/m)	RSS (mV/m)
1	KKLQ	11.0665	11.0665	1	KKLQ	10.7148	10.7148
2	KSJB	4.0606	11.0665	2	KSJB	3.4090	11.2441
3	KIIX	3.9254	11.0665	3	KROD	3.0939	11.6620
4	KROD	3.4717	11.0665	4	WMT	2.8653	12.0088
5	KTBB	3.0378	11.0665	5	KTBB	2.8426	12.3406
6	WMT	2.7196	11.0665	6	KIIX	2.7494	12.6432
7	KHTE	2.5158	11.0665	7	KSUB	2.3309	12.8563
8	XEDN	2.1771	11.0665	8	WREC	2.2869	13.0581
9	KGEZ	1.9993	11.0665	9	XEDN	1.8504	13.1885
10	WREC	1.8324	11.0665	10	KRSO	1.8158	13.3129
11	CFQC	1.6554	11.0665	11	KFRC	1.8085	13.4352
12	CHRX	1.2896	11.0665	12	KHTE	1.7765	13.5522
13	XEMN	0.7169	11.0665	13	KAVL	1.7290	13.6620
14	XEBB	0.3780	11.0665	14	KZSS	1.6261	13.7585
15	XEGT	0.3606	11.0665	15	KVNU	1.5531	13.8458
16	XEZ	0.2666	11.0665	16	CFQC	1.4454	13.9211
17	WOKV	0.2053	11.0665	17	KGEZ	1.4371	13.9951
18	WSJS	0.1487	11.0665	18	CHRX	1.2204	14.0482
19	WICC	0.1105	11.0665	19	KAQQ	1.1036	14.0914
20	CFCT	0.1072	11.0665	20	XEHQ	0.9961	14.1266
21	WCAO	0.1011	11.0665	21	KCSJ	0.9918	14.1614
22	CBNA	0.0931	11.0665	22	KID	0.9240	14.1915
23	CFCH	0.0569	11.0665	23	WOW	0.8915	14.2195
24	CFCF	0.0520	11.0665	24	WDAF	0.8699	14.2461
25	CKCL	0.0447	11.0665	25	KLBJ	0.8615	14.2721
26	WTAC	0.0218	11.0665	26	XEBB	0.7649	14.2926
27	CKYL	0.0000	11.0665	27	XEMN	0.6968	14.3095
28	CHNL	0.0000	11.0665	28	XEPH	0.6028	14.3222
29	CJAT	0.0000	11.0665	29	XEGS	0.5451	14.3326
30	CHTM	0.0000	11.0665	30	XEZ	0.5398	14.3428
31	CKYQ	0.0000	11.0665	31	KTHO	0.5315	14.3526
32	CKTB	0.0000	11.0665	32	XEGT	0.5302	14.3624
33	CFLO	0.0000	11.0665	33	KYJC	0.5090	14.3714
34	CHNC	0.0000	11.0665	34	KUGN	0.4966	14.3800
35	CKRW	0.0000	11.0665	35	KILT	0.4747	14.3878
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94	WLVA	0.0000	11.0665	94	CKYQ	0.0025	14.4281

Table II

Current versus Proposed RSS

		Current Rules		Proposed Rules	
Call	Location	RSS (mV/M)	Area (sq. mi.)	RSS (mV/M)	Area (sq. mi.)
KCLS	Flagstaff, AZ	11.067	278.5	14.428	179.7
KHTE	Redding, CA	10.552	498.3	12.418	395.4
KKLQ	San Diego, CA	2.724	29398.4	8.365	5528.7
KIIX	Wellington, CO	19.979	98.9	18.699	111.1
WICC	Bridgeport, CT	3.911	705.2	11.122	214.7
WOKV	Jacksonville, FL	11.285	2017.6	16.998	789.3
WMT	Cedar Rapids, IA	2.642	10725.6	9.291	2186.6
WCAO	Baltimore, MD	3.809	2570.0	12.082	668.8
WTAC	Flint, MI	9.053	329.6	21.002	84.9
KGEZ	Kalispell, MT	17.813	150.3	15.126	190.8
WSJS	Winston-Salem, NC	5.309	952.0	8.765	524.8
KSJB	Jamestown, ND	11.186	3259.8	9.871	4005.9
WREC	Memphis, TN	2.262	10228.3	9.038	2090.0
KROD	El Paso, TX	7.886	1330.0	14.013	667.0
KTBB	Tyler, TX	21.800	306.6	21.793	306.7

Table III

How KCLS Restricts Other U.S. Stations

		Current Rules			Proposed Rules		
Call	Ch	Limit (mV/m)	Permiss Limit (mV/m)	Increase Allowed	Limit (mV/m)	Permiss Limit (mV/m)	Increase Allowed
KKLQ	0	11.07	5.53	0.00	10.71	1.00	**
KSJB	0	4.06	5.53	1.36	3.41	1.00	**
KROD	0	3.47	5.53	1.59	3.09	1.00	**
WMT	0	2.72	5.53	2.03	2.87	1.00	**
KTBB	0	3.04	5.53	1.82	2.84	1.00	**
KIIX	0	3.93	5.53	1.41	2.75	1.00	**
KSUB	-	0.00	5.53	*	2.33	1.00	**
WREC	0	1.83	5.53	3.02	2.29	1.00	**
KRSO	-	0.00	5.53	*	1.82	1.00	**
KFRC	+	0.00	5.53	*	1.81	1.00	**
KHTE	0	2.52	5.53	2.20	1.78	1.00	**
KAVL	+	0.00	5.53	*	1.73	1.00	**
KVNU	+	0.00	5.53	*	1.55	1.00	**
KGEZ	0	2.00	5.53	2.77	1.44	1.00	**
KAQQ	-	0.00	5.53	*	1.10	1.00	**
KCSJ	-	0.00	5.53	*	0.99	1.00	1.01
WDAF	+	0.00	5.53	*	0.87	1.00	1.15
KUGN	-	0.00	5.53	*	0.50	1.00	2.01
KILT	+	0.00	5.53	*	0.47	1.00	2.11
WOKV	0	0.21	5.53	26.95	0.35	1.00	2.85
WIOD	+	0.00	5.53	*	0.26	1.00	3.83
KDAL	+	0.00	5.53	*	0.25	1.00	4.04
KOJM	+	0.00	5.53	*	0.23	1.00	4.27
WSJS	0	0.15	5.53	37.21	0.22	1.00	4.52
WIP	+	0.00	5.53	*	0.14	1.00	6.93
WCAO	0	0.10	5.53	54.72	0.14	1.00	7.38
KARV	+	0.00	5.53	*	0.13	1.00	7.43
WICC	0	0.11	5.53	50.08	0.13	1.00	7.47
WCEO	-	0.00	5.53	*	0.12	1.00	8.31
WAFC	-	0.00	5.53	*	0.08	1.00	12.40
KONA	+	0.00	5.53	*	0.05	1.00	21.51
WMBS	-	0.00	5.53	*	0.03	1.00	37.58
WTAC	0	0.02	5.53	253.28	0.03	1.00	37.85
WJMS	-	0.00	5.53	*	0.02	1.00	46.17

* No restriction.

** No increase allowed. Modification would be permitted if limit is reduced at least 10%.

Table IV

How Other U.S. Stations Restrict KCLS

				Current Rules			Proposed Rules		
Call	Ch	Az. (°T)	Dist. (mi.)	Limit (mV/m)	Permiss Limit (mV/m)	Increase Allowed	Limit (mV/m)	Permiss Limit (mV/m)	Increase Allowed
KOJM	+	5.8	931.2	0.00	5.16	*	0.40	1.00	2.50
KSJB	0	36.1	1047.4	1.23	5.59	4.53	1.04	1.00	**
KIIX	0	41.9	522.0	5.44	9.99	1.84	3.84	1.00	**
KDAL	+	45.9	1286.4	0.00	5.89	*	0.21	1.00	4.87
KCSJ	-	58.7	446.6	0.00	5.79	*	1.48	1.00	**
WMT	0	60.4	1182.3	0.80	1.32	1.66	0.84	1.00	1.19
WTAC	0	61.9	1588.6	0.35	4.53	13.07	0.42	1.00	2.38
WKZO	-	62.8	1484.5	0.00	5.33	*	0.16	1.00	6.34
WROW	-	64.4	2082.8	0.00	4.77	*	0.06	1.00	15.44
WSNG	+	66.0	2120.1	0.00	6.88	*	0.06	1.00	15.82
WICC	0	67.2	2114.9	0.17	1.96	11.54	0.21	1.00	4.86
WDAF	+	69.4	974.0	0.00	1.61	*	0.39	1.00	2.54
WMBS	-	70.0	1770.0	0.00	2.82	*	0.11	1.00	9.31
WCAO	0	70.9	1929.4	0.21	1.90	9.23	0.28	1.00	3.62
WUSQ	+	71.5	1852.0	0.00	8.29	*	0.10	1.00	10.28
WLVA	-	75.5	1805.2	0.00	4.59	*	0.11	1.00	9.37
WSJS	0	78.7	1752.5	0.25	2.65	10.72	0.37	1.00	2.71
WROQ	+	80.8	1730.5	0.00	5.83	*	0.12	1.00	8.30
WREC	0	83.7	1221.3	0.63	1.13	1.80	0.78	1.00	1.28
KARV	+	84.2	1044.0	0.00	8.36	*	0.33	1.00	3.01
WZZK	+	87.6	1416.5	0.00	5.84	*	0.18	1.00	5.47
KZSS	+	90.8	283.3	0.00	4.27	*	2.16	1.00	**
WOKV	0	92.5	1764.9	0.22	5.64	26.10	0.37	1.00	2.70
WGNE	-	95.5	1550.6	0.00	4.67	*	0.15	1.00	6.72
KTBB	0	97.3	966.6	1.18	10.90	9.25	1.10	1.00	**
WAFC	-	99.3	1906.2	0.00	12.27	*	0.10	1.00	10.19
KROD	0	125.1	379.0	3.32	3.94	1.19	2.90	1.00	**
KKLQ	0	242.8	353.5	0.89	1.36	1.54	0.84	1.00	1.19
KFRC	+	290.3	617.8	0.00	1.96	*	0.49	1.00	2.04
KHTE	0	305.9	691.4	2.22	5.28	2.38	1.56	1.00	**
KUGN	-	318.8	862.9	0.00	8.08	*	0.38	1.00	2.64
KSUB	-	334.5	192.6	0.00	5.38	*	3.25	1.00	**
KGEZ	0	352.3	906.4	1.81	8.91	4.92	1.30	1.00	**
KVNU	+	358.2	448.5	0.00	4.77	*	1.45	1.00	**

* No restriction.

** No increase allowed. Modification would be permitted if limit is reduced at least 10%.

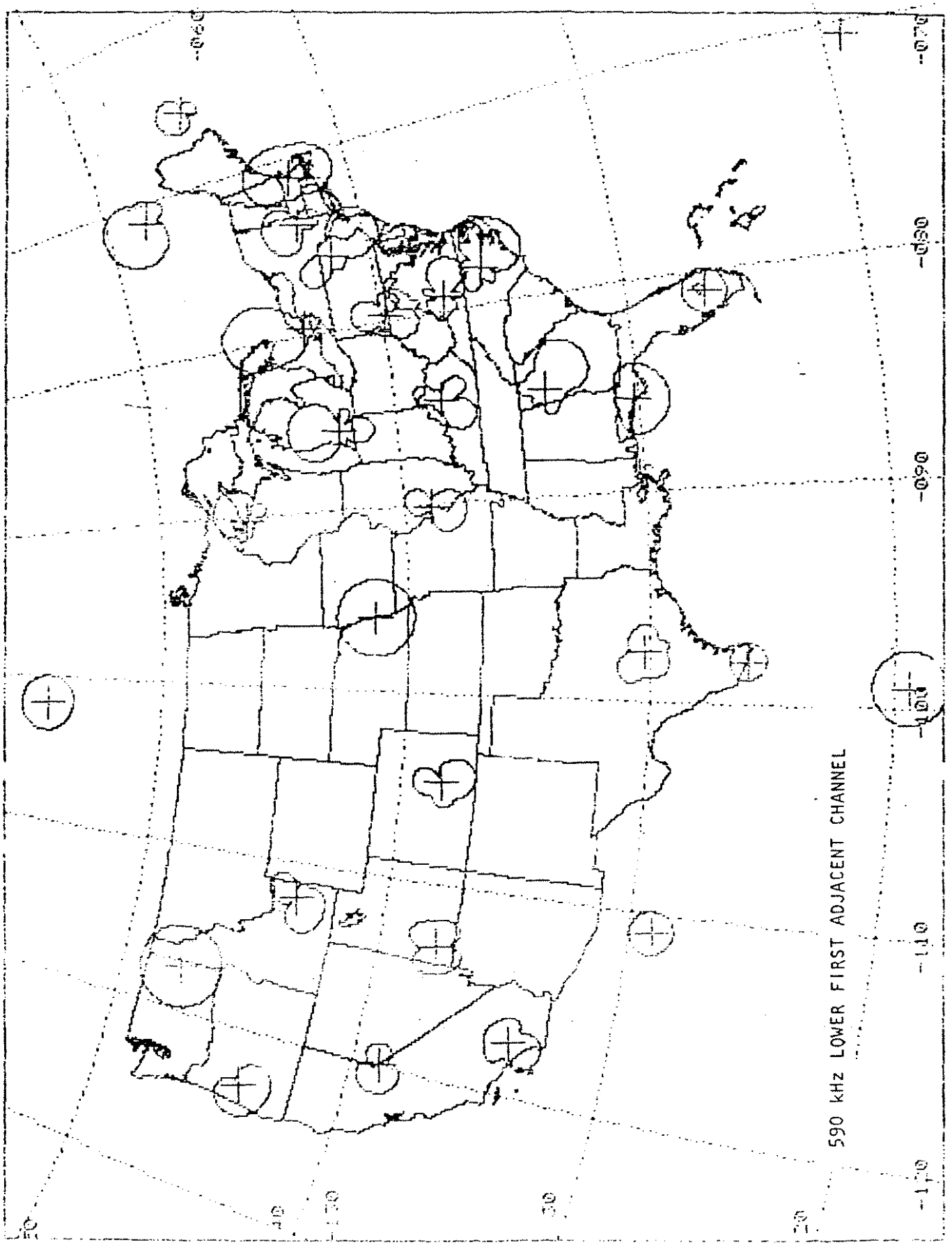

EXHIBIT 2.1

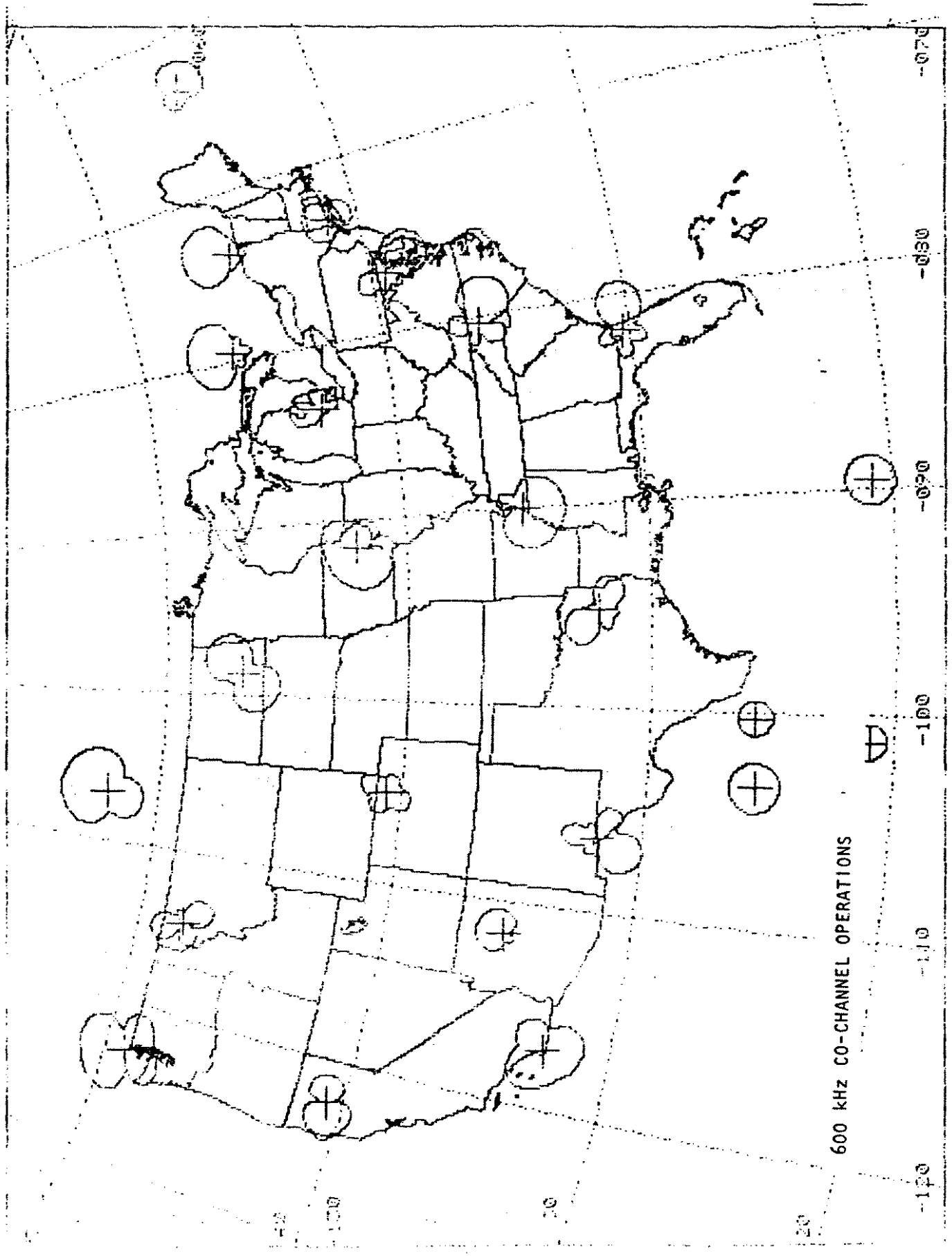

EXHIBIT 2.2

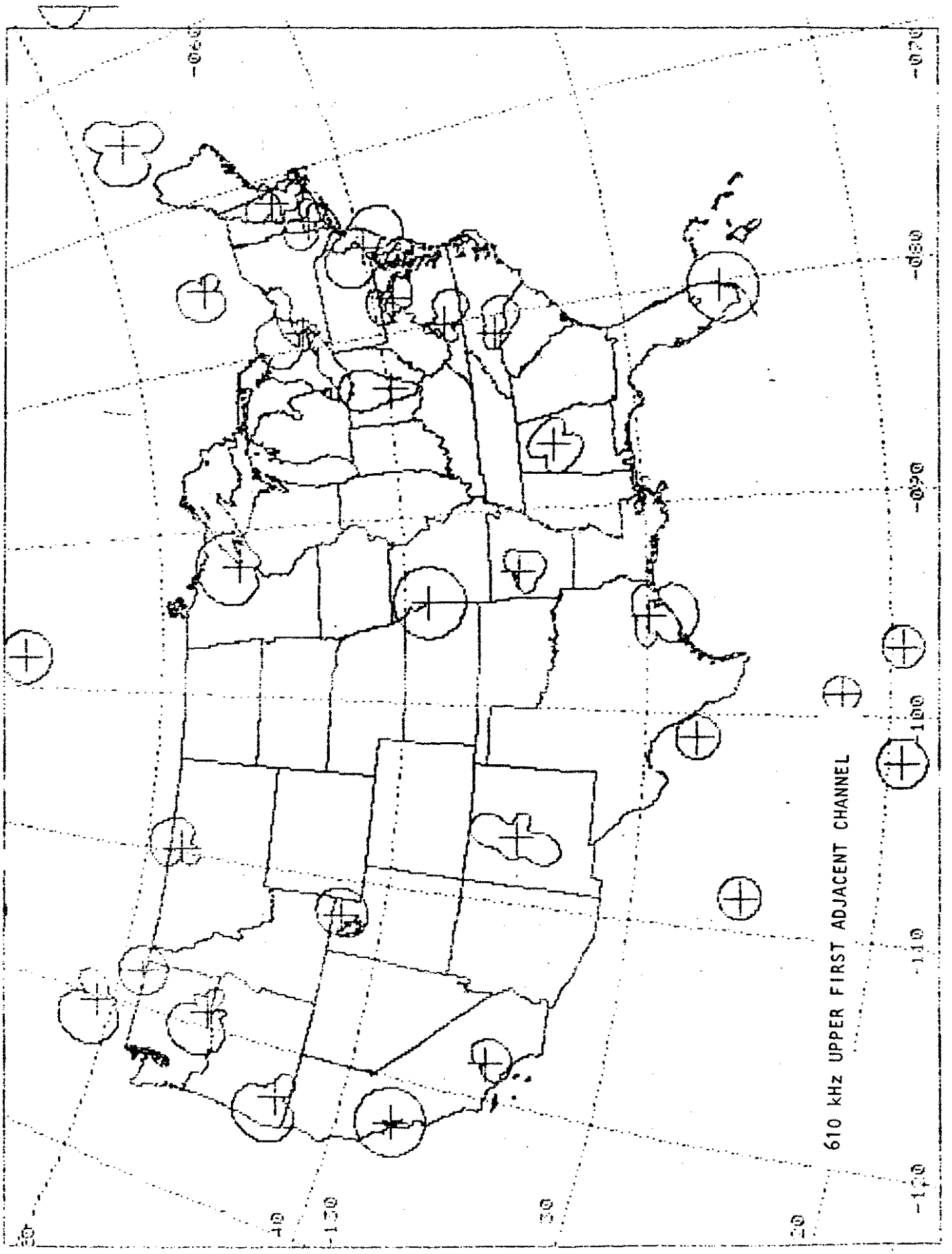

EXHIBIT 2.3

Appendix 3

AM Inteference Improvement on a Sample Channel as a Result of the Migration Process

Using the new nighttime standards proposed in this proceeding, the new nighttime curves, 0% RSS exclusion and adjacent channel protection, the following table demonstrates the improvement that can occur on a frequency when a station elects to transfer its nighttime operation to the expanded band. The Class III frequency of 590 kHz was randomly selected and station WOW, Omaha, NE was chosen because of its central location.

		Including WOW		Excluding WOW	
Call	Location	NightLimit (mV/m)	Coverage (sq. mi.)	Night Limit (mV/m)	Coverage (sq. mi.)
KHAR	ANCHORAGE,AK	0.828	18,098	0.827	18,118
KRSO	SAN BERNDNO,CA	13.68	282	13.58	285
KTHO	S. LK TAHOE,CA	16.94	68.6	16.87	69.0
KCSJ	PUEBLO,CO	13.01	462	10.40	681
WAFC	CLEWISTON,FL	24.09	68.2	24.03	68.5
WGNE	PANAMA CT,FL	13.10	409	12.78	432
WKHX	ATLANTA,GA	13.68	329	13.18	342
KID	IDAHO FLS,ID	15.25	320	14.94	331
WCEO	WOOD RIVER,IL	14.44	371	7.03	1241
WVLK	LEXINGTON,KY	17.58	185	16.85	197
WEEI	BOSTON, MA	10.02	998	9.97	1007
WJMS	IRONWOOD,MI	17.85	157	16.12	182
WKZO	KALAMAZOO,MI	10.35	468	8.27	652
WGTM	WILSON,NC	21.19	203	21.08	205
WROW	ALBANY,NY	16.37	175	16.31	176
KUGN	EUGENE,OR	17.30	187	17.27	188
WARM	SCRANTON,PA	9.43	1035	9.25	1054
WMBS	UNIONTOWN,PA	10.26	348	9.86	368
KLBJ	AUSTIN,TX	10.85	631	9.97	723
KSUB	CEDAR CITY,UT	12.79	566	12.50	590
WLVA	LYNCHBURG,VA	19.28	85	19.10	86
KAQQ	SPOKANE, WA	5.04	3643	4.84	3798

Note: Coverage was based on FCC Figure M-3 conductivities.

Appendix 4

Method of Determining Individual Improvement Factors for Ranking Purposes

An improvement factor is a ratio that is determined for a particular station by combining two aspects of its nighttime operation, interference caused and service provided, which, respectively, are the numerator and denominator of the ratio. The numerator is calculated by using the results of a two-step comparison. First, the RSS and associated coverage areas are computed for all stations to which the subject station causes interference. Next, the same computations are repeated but exclude any interference from the subject station. For each of these stations, the difference in the coverage area represents the interference the subject station causes to that other station. The sum of these differences depicts the total interference caused to other stations and is the numerator of the improvement factor. The denominator is the subject station's service area based upon its RSS value or the E_{nom} for the station's class, whichever is greater.

The following three hypothetical examples illustrate the method of calculating improvement factors. In each example, it is assumed that, besides the subject station, six other stations operate at night.

Example 1: KAAC, Maple, NE, 1310 kHz (RSS = 3.6 mV/m; area = 4072 sq. mi.)

	With KAAC		Without KAAC		
Call, City, State	RSS (mV/m)	Area (sq. mi.)	RSS (mV/m)	Area (sq. mi.)	Δ Area (sq. mi.)
KAXX, Cactus, AZ	3.7	801	3.7	801	0
KBXX, Tumbleweed, TX	9.1	774	7.4	1064	290
KCXX, Pine, WY	7.7	625	6.2	814	189
KDXX, Prairie, KS	14.7	172	8.2	452	280
WAXX, Peach, GA	3.9	911	3.9	911	0
WBXX, Elm, IL	5.9	1075	5.1	1225	150
				Total	909

Improvement Factor (KAAC): (909/4072) = 0.223

Example 2: KZAC, Maple, NE, 550 kHz (RSS = 2.6 mV/m; area = 22,700 sq. mi.)

	With KZAC		Without KZAC		
Call, City, State	RSS (mV/m)	Area (sq. mi.)	RSS (mV/m)	Area (sq. mi.)	Δ Area (sq. mi.)
KXAX, Redwood, WA	11.6	501	11.6	501	0
KXBX, Aspen, CO	9.9	755	7.5	1195	440
KXCX, Birch, TX	9.5	830	9.0	910	80
WXAX, Chestnut, IL	13.6	346	5.2	1590	1244
WXBX, Cherry, MI	21.8	121	18.8	154	33
WXCX, Beechwood, KY	14.5	346	14.3	353	7
				Total	1804

Improvement Factor (KZAC): (1804/22700) = 0.0795

Example 3: WAAB, Sycamore, PA, 570 kHz (RSS = 8.7 mV/m; area = 855 sq. mi.)

	With WAAB		Without WAAB		
Call, City, State	RSS (mV/m)	Area (sq. mi.)	RSS (mV/m)	Area (sq. mi.)	Δ Area (sq. mi.)
WXXA, Oak, PA	7.0	2206	6.5	2445	239
WXXB, Palm,FL	7.8	254	7.7	260	6
WXXC, Spruce, GA	9.3	1452	8.6	1590	138
WXXD, Dogwood, VA	7.3	373	6.9	401	28
WXXE, Azalea, KY	14.5	346	12.7	437	91
WXXF, Poplar, PA	6.8	444	6.8	444	0
				Total	502

Improvement Factor (WAAB): (502/855) = 0.587

As is evident in the above examples, the improvement factor of KAAC (1310 kHz) is greater than that of KZAC (550 kHz), both of which are located at Maple, NE. If the two stations were vying for a single available expanded band allotment in the vicinty of Maple, NE, the clear choice in this particular competition would be KAAC. This approach is effective in minimizing the comparative disadvantages attributable to operation on the higher frequencies.

Of the three stations evaluated above, the highest improvement factor belongs to WAAB, Sycamore, PA (570 kHz). This is not, however, significant in terms of selecting a candidate for expanded band migration in the Maple, NE area. Nevertheless, this result could be useful in prioritizing locations when establishing the overall allotment plan.

Appendix 5

Part 2 of Title 47 of the CFR is amended as follows:

1. The authority citation for Part 2 continues to read as follows:

Authority: 47 U.S.C. 154 and 303

2. Section §2.106 is amended by revising the 535-1705 kHz band, by revising footnotes US221, US238, US299, NG128 and 480 and by removing footnote US237 as follows:

§2.106 Table of Frequency Allocations

* * * * *

United States table		FCC use designators	
Government Allocation kHz	Non-government Allocation kHz	Rule part(s)	Special-use frequencies
(4)	(5)	(6)	(7)
* * *	* * *	* * *	* * *
535-1705	535-1705 BROADCASTING.	RADIO BROADCASTING. (AM) (73). Alaska Fixed (80). Auxiliary Broadcasting (74). Private Land Mobile (90).	1610, 1620, 1630, 1640, 1650, 1660, 1670, 1680, 1690, 1700 kHz: Travelers information.
480 US221 US299	480 US221 US299 NG128		

* * * * *

UNITED STATES (US) FOOTNOTES

* * * * *

US221 The 1605-1705 kHz band is allocated to the mobile service on a secondary basis. Mobile use of the 525-535 and 1605-1705 kHz bands is limited to distribution of public service information from Travelers Information

Stations operating on 530, 1610, 1620, 1630, 1640, 1650, 1660, 1670, 1680, 1690 or 1700 kHz.

* * * * *

US238 The 1605-1705 kHz band is allocated to the radiolocation service on a secondary basis.

* * * * *

US299 The 1615-1705 kHz band in Alaska is also allocated to the maritime mobile services and the Alaska fixed service on a secondary basis to Region 2 broadcast operations.

* * * * *

NON-GOVERNMENT (NG) FOOTNOTES

* * * * *

NG128 In the 535-1705 kHz band, AM broadcast licensees or permittees may use their AM carrier on a secondary basis to transmit signals intended for both broadcast and non-broadcast purposes. In the 88-108 MHz band, FM broadcast licensees or permittees are permitted to use subcarriers on a secondary basis to transmit signals intended for both broadcast and non-broadcast purposes. In the 54-72, 76-88, 174-216 and 740-890 MHz bands, TV broadcast licensees or permittees are permitted to use subcarriers on a secondary basis for both broadcast and non-broadcast purposes.

* * * * *

INTERNATIONAL FOOTNOTES

* * * * *

480 In Region 2, the use of the 1605-1705 kHz band by stations of the broadcasting service is subject to the Plan established by the Regional Administrative Radio Conference (Rio de Janeiro, 1988).

In Region 2, in the 1625-1705 kHz band, the relationship between the broadcasting, fixed and mobile services is shown in No. 419. However, the examination of frequency assignments to stations of the fixed and mobile services in the 1625-1705 kHz band under No. 1241 shall take account of the allotments appearing in the plan established by the Regional Administrative Radio Conference (Rio de Janeiro, 1988).

* * * * *

Part 73 of Title 47 of the CFR is amended as follows:

3. The authority citation for Part 73 continues to read as follows:

Authority: 47 U.S.C. 154 and 303.

4. Section 73.14 is amended by removing the Note following the definition of AM broadcast channel, by removing the last sentence of the definition of AM broadcast station, by removing the definitions of Dominant station and Secondary AM station, and by revising the definitions of AM broadcast band, AM broadcast channel, AM broadcast station, Main channel, Maximum percentage of modulation and Stereophonic channel, to read as follows:

§73.14 AM broadcast definitions.

AM broadcast band. The band of frequencies extending from 535 to 1705 kHz.

AM broadcast channel. The band of frequencies occupied by the carrier and the upper and lower sidebands of an AM broadcast signal with the carrier frequency at the center. Channels are designated by their assigned carrier frequencies. The 117 carrier frequencies assigned to AM broadcast stations begin at 540 kHz and progress in 10 kHz steps to 1700 kHz. (See §73.21 for the classification of AM broadcast channels).

AM broadcast station. A broadcast station licensed for the dissemination of radio communications intended to be received by the public and operated on a channel in the AM broadcast band.

* * * * *

Main channel. The band of audio frequencies from 50 to 10,000 Hz which amplitude modulates the carrier.

Maximum percentage of modulation. The greatest percentage of modulation that may be obtained by a transmitter without producing in its output, harmonics of the modulating frequency in excess of those permitted by these regulations. (See §73.1570)

* * * * *

Stereophonic channel. The band of audio frequencies from 50 to 10,000 Hz containing the stereophonic information which modulates the radio frequency carrier.

* * * * *

5. Section 73.21 is revised to read as follows:

§73.21 Classes of AM broadcast channels and stations.

(a) Clear channel. A clear channel is one on which stations are assigned to serve wide areas. These stations are protected from objectionable interference within their primary service areas and, depending on the class of station, their secondary service areas. Stations operating on these channels are classified as follows:

(1) Class A station. A Class A station is an unlimited time station that operates on a clear channel and is designed to render primary and secondary service over an extended area and at relatively long distances from its transmitter. Its primary and secondary service areas are protected from objectionable interference from other stations on the same and adjacent channels. (See §73.182). The operating power shall not be less than 10 kW nor more than 50 kW. (Also see §73.25(a)).

(2) Class B station. A Class B station is an unlimited time station which is designed to render service only over a primary service area. Class B stations are authorized to operate with a minimum power of 0.25 kW (or, if less than 0.25 kW, an equivalent RMS antenna field of at least 141 mV/m at 1 km) and a maximum power of 50 kW.

(3) Class D station. A Class D station operates either daytime, limited time or unlimited time with nighttime power less than 0.25 kW and an equivalent RMS antenna field of less than 141 mV/m at one km. Class D stations shall operate with daytime powers not less than 0.25 kW nor more than 50 kW. Nighttime operations of Class D stations are not afforded protection and must protect all Class A and B operations during nighttime hours. New Class D stations will not be authorized.

(b) Regional Channel. A regional channel is one on which Class B and D stations may operate and serve primarily a principal center of population and the rural area contiguous thereto.

Note: Until the North American Regional Broadcasting Agreement (NARBA) is terminated with respect to the Bahama Islands and the Dominican Republic, radiation toward those countries from a Class B station may not exceed the level that would be produced by an omnidirectional antenna with a transmitted power of 5 kW, or such lower level as will comply with NARBA requirements for protection of stations in the Bahama Islands and the Dominican Republic against objectionable interference.

(c) Local channel. A local channel is one on which stations operate unlimited time and serve primarily a community and the suburban and rural areas contiguous thereto.

(1) Class C station. A Class C station is a station operating on a local channel and is designed to render service only over a primary service area that may be reduced as a consequence of interference in accordance with

§73.182. The power shall not be less than 0.25 kW, nor more than 1 kW. Class C stations that are licensed to operate with 0.1 kW may continue to do so.

6. Section 73.22 is removed.

7. Section 73.3570 is redesignated as Section 73.23 and revised to read as follows:

§73.23 AM broadcast station applications affected by international agreements.

(a) Except as provided in paragraph (b) of this section, no application for an AM station will be accepted for filing if authorization of the facilities requested would be inconsistent with international commitments of the United States under treaties and other international agreements, arrangements and understandings. (See list of such international instruments in §73.1650(b)). Any such application that is inadvertently accepted for filing will be dismissed.

(b) AM applications that involve conflicts only with the North American Regional Broadcasting Agreement (NARBA), but that are in conformity with the remaining treaties and other international agreements listed in §73.1650(b) and with the other requirements of Part 73, will be granted subject to such modifications as the FCC may subsequently find appropriate, taking international considerations into account.

(c) In the case of any application designated for hearing on issues other than those related to consistency with international relationships and as to which no final decision has been rendered, whenever action under this section becomes appropriate because of inconsistency with international relationships, the applicant involved shall, notwithstanding the provisions §§73.3522 and 73.3571, be permitted to amend its application to achieve consistency with such relationships. In such cases the provisions of §73.3605(c) will apply.

(d) In some circumstances, special international considerations may require that the FCC, in acting on applications, follow procedures different from those established for general use. In such cases, affected applicants will be informed of the procedures to be followed.

8. In Section 73.24, the Note following paragraph (b) is removed, the last sentence of paragraph (e) is removed, paragraph (i) is removed, paragraph (h) is redesignated as paragraph (i) and revised, a new paragraph (h) is added, and paragraph (j) is revised to read as follows:

§73.24 Broadcast facilities; showing required.

* * * * *

(e) That the technical equipment proposed, the location of the transmitter, and other technical phases of operation comply with the regulations governing the same, and the requirements of good engineering practice.

* * * * *

(h) That all persons are adequately protected from the energy radiated from the transmitting system in accordance with pertinent sections of OST Bulletin No. 65, October 1985, Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation.

(i) That, in the case of an application for a Class B or D station on a clear channel, the proposed station would radiate, during two hours following local sunrise and two hours preceding local sunset, in any direction toward the 0.1 mV/m groundwave contour of a co-channel United States Class A station, no more than the maximum values permitted under the provisions of §73.187.

(j) That, for all stations, the daytime 5 mV/m contour encompasses the entire principal community to be served. For stations in the 535-1605 kHz band, 80% of the principal community is encompassed by the nighttime 5 mV/m contour or the nighttime interference-free contour, whichever value is higher. For stations in the 1605-1705 kHz band, 50% of the principal community is encompassed by the 5 mV/m contour or the nighttime interference-free contour, whichever value is higher. Class D stations with nighttime authorizations need not demonstrate such coverage during nighttime operation.

* * * * *

9. In Section 73.25, paragraphs (a)(1), (a)(2), (a)(2)(i), (a)(2)(ii) and (a)(2)(iii) are removed, and the heading, paragraphs (a), (b), and (c) and the Note following paragraph (b) are revised to read as follows:

§73.25 Clear channels; Classes A, B and D stations.

* * * * *

(a) On each of the following channels, one Class A station may be assigned, operating with power of 50 kW: 640, 650, 660, 670, 700, 720, 750, 760, 770, 780, 820, 830, 840, 870, 880, 890, 1020, 1030, 1040, 1100, 1120, 1160, 1180, 1200, and 1210 kHz. In Alaska, these frequencies can be used by Class A stations subject to the conditions set forth in §73.182(a)(1)(ii). On the channels listed in this paragraph, Class B stations may be assigned. Class D stations that are licensed to operate on these channels may continue to do so.

(b) To each of the following channels there may be assigned Class A and B stations: 680, 710, 810, 850, 940, 1000, 1060, 1070, 1080, 1090, 1110, 1130, 1140, 1170, 1190, 1500, 1510, 1520, 1530, 1540, 1550, and 1560 kHz. Class D stations that are licensed to operate on these channels may continue to do so.

Note: Until superseded by a new agreement, protection of the Bahama Islands shall be in accordance with NARBA. Accordingly, a Class A, B or D station on 1540 kHz shall restrict its signal to a value no greater than 4 μV/m groundwave or 25 μV/m 10% skywave at any point of land in the Bahama Islands, and such stations operating nighttime (i.e., sunset to sunrise at the location of the U.S. station) shall be located not less than 650 miles from the nearest point of land in the Bahama Islands.

(c) Class B and D stations may be assigned on 540, 690, 730, 740, 800, 860, 900, 990, 1010, 1050, 1220, 1540, 1570, and 1580 kHz.

10. Section 73.26 is revised to read as follows:

§73.26 Regional channels; Class B and D stations.

(a) The following frequencies are designated as regional channels and are assigned for use by Class B and D stations: 550, 560, 570, 580, 590, 600, 610, 620, 630, 790, 910, 920, 930, 950, 960, 970, 980, 1150, 1250, 1260, 1270, 1280, 1290, 1300, 1310, 1320, 1330, 1350, 1360, 1370, 1380, 1390, 1410, 1420, 1430, 1440, 1460, 1470, 1480, 1590, 1600, 1610, 1620, 1630, 1640, 1650, 1660, 1670, 1680, 1690, and 1700 kHz.

(b) Additionally, in Alaska, Hawaii, Puerto Rico, and the U.S. Virgin Islands the frequencies 1230, 1240, 1340, 1400, 1450, and 1490 kHz are designated as Regional channels, and are assigned for use by Class B stations. Stations formerly licensed to these channels in those locations as Class C stations are redesignated as Class B stations.

11. Section 73.27 is revised to read as follows:

§73.27 Local channels; Class C stations.

Within the conterminous 48 states, the following frequencies are designated as local channels, and are assigned for use by Class C stations: 1230, 1240, 1340, 1400, 1450, and 1490 kHz.

12. In Section 73.28, paragraph (a) is removed, paragraph (b) is redesignated as paragraph (a) and revised to read as follows:

§73.28 Assignment of stations to channels.

(a) The Commission will not make an AM station assignment that does not conform with international requirements and restrictions on spectrum use that the United States has accepted as a signatory to treaties, conventions, and other international agreements. See §73.1650 for a list of pertinent treaties, conventions and agreements, and §73.23 for procedural provisions relating to compliance with them.

* * * * *

13. Section 73.29 is revised to read as follows:

§73.29 Class C stations on regional channels.

No license will be granted for the operation of a Class C station on a regional channel.

14. A new Section 73.30 is added to read as follows:

§73.30 Petition for authorization of an allotment in the 1605-1705 kHz band.

(a) Any party interested in applying for an AM broadcast station to be operated on one of the ten channels in the 1605-1705 kHz band must first file a petition for the establishment of an allotment to its proposed community of service. Each petition must include the following information:

(1) Name of community for which allotment is sought. (2) Station call letters. (3) Calculated improvement factor and supporting data (submitted only if petition is filed by an existing station intending to migrate from the 540-1600 kHz band. (See §73.35 for calculation method).

(b) If awarded an allotment, a petitioner will have sixty days from the date of public notice of selection to file an application for construction permit. (See §§73.24 and 73.37(e) for filing requirements).

Note 1: Until further notice by the Commission, the filing of these petitions is limited to licensees (Class C stations excluded) of existing AM stations operating in the 535-1605 kHz band. Selection among competing petitions will be based on interference reduction. The station demonstrating the highest value of improvement factor will be afforded the highest priority for an allotment, with the next priority going to the station with next highest value, and so on, until available allotments are filled.

Note 2: The Commission will periodically evaluate the progress of the movement of interfering stations to the 1605-1705 kHz band with a view to determining whether the 1605-1705 kHz band should be administered on an allotment or assignment basis. The Commission will later develop permanent procedures for use of the 1605-1705 kHz band by existing station licensees and others.

Note 3: Existing Class B stations are given first consideration for selection as described in Note 1. In the event that an allotment availability exists for which no fulltime station has filed a relevant petition, such allotment may be awarded to a licensed daytime only station. If more than one daytime-only station were to apply for this migration opportunity, the following priorities will be used in the selection process:

(a) First priority. A station located within the 0.5 mV/m-50% contour of a U.S. Class A station and licensed to serve a community of 100,000 or more, for which there exists no local fulltime aural service.

(b) Second priority. Any other daytime-only station that can not operate at night.

(c) Third priority. Any station, not eligible under 1 and 2 above, that could be allowed the least amount of power under the terms of Section 73.182.

15. Section 73.35 is added to read as follows:

§73.35 Calculation of improvement factors.

(a) A petition for an allotment in the 1605-1705 kHz band filed by an existing fulltime AM station licensed in the 535-1605 kHz band must be accompanied by the station's calculated improvement factor. (See §73.30) Improvement factors relate only to nighttime conditions and are based on two distinct considerations: (1) service area lost by other stations due to interference caused by the subject station, and (2) service area of the subject station. These considerations are represented by a ratio. To determine the numerator of the ratio (first consideration), calculate the RSS and associated service area of the stations (co- and adjacent channel) to which the subject station causes nighttime interference. Next, repeat the RSS and service area calculations excluding the subject station. The cumulative gain in the above service areas is the numerator of the ratio. The denominator (second consideration) is the subject station's interference-free service area. The value of this ratio will constitute the petitioner's improvement factor. Notwithstanding the requirements of §73.153, for uniform comparisons and simplicity, measurement data will not be used for determining improvement factors and FCC figure M-3 ground conductivity values are to be used exclusively in accordance with the pertinent provisions of §73.183(c)(1).

16. Section 73.37 is revised to read as follows:

§73.37 Applications for broadcast facilities, showing required.

(a) No application will be accepted for a new station if the proposed operation would involve overlap of signal strength contours with any other station as set forth below in this paragraph; and no application will be accepted for a change of the facilities of an existing station if the proposed change would involve such overlap where there is not already such overlap between the stations involved:

Frequency separation (kHz)	Contour of proposed station (Classes B, C and D) (mV/m)	Contour of any other station (mV/m)	
0	0.005	0.1	(Class A)
	0.025	0.5	(Other classes)
	0.5	0.025	(All classes)
10	0.079	0.5	(All classes)
	0.5	0.079	(All classes)
20	2	25	(All classes)
	25	2	(All classes)
30	25	25	(All classes)

(b) In determining overlap received, an application for a new Class C station with daytime power of 250 watts, or greater, shall be considered on the assumption that both the proposed operation and all existing Class C stations operate with 250 watts and utilize non-directional antennas.

(c) If otherwise consistent with the public interest and subject to Section 316 of the Communications Act, an application requesting an increase in the daytime power of an existing Class C station on a local channel from 250 watts to a maximum of 1 kW, or from 100 watts to a maximum of 500 watts, may be granted notwithstanding overlap prohibited by paragraph (a) of this section. In the case of a 100 watt Class C station increasing daytime power, the provisions of this paragraph shall not be construed to permit an increase in power to more than 500 watts, if prohibited overlap would be involved, even if successive applications should be tendered.

(d) In addition to a demonstration of compliance with the requirement of paragraphs (a), and, as appropriate, (b), and (c) of this section, an application for a new AM broadcast station, or for a major change (see §73.3571(a)(1) of this chapter) in an authorized AM broadcast station, as a condition for its acceptance, shall make a satisfactory showing, if new or modified nighttime operation by a Class B station is proposed, that objectionable interference will not result to an authorized station, as determined pursuant to §73.182(1) of this chapter.

(e) An application for an authorization in the 1605-1705kHz band which has been selected through the petition process (See §73.30) is not required to demonstrate compliance with (a), (b), (c), or (d) of this section. A conditional grant of such an operation will be issued under the presumption of compliance with those sections and successful accomplishment of the terms of such station's construction permit shall be considered as sufficient justification for issuance of license.

Note 1: In the case of applications for changes in the facilities of AM broadcast stations covered by this section, an application will be accepted even though overlap of field strength contours as mentioned in this section would occur with another station in an area where such overlap does not already exist, if: (1) The total area of overlap with that station would not be increased; (2) there would be no net increase in the area of overlap with any other station; and (3) there would be created no area of overlap with any station with which overlap does not now exist.

Note 2: The provisions of this section concerning prohibited overlap of field strength contours will not apply where: (1) the area of overlap lies entirely over sea water: or (2) the only overlap involved would be that caused to a foreign station, in which case the provisions of the applicable international agreement, as identified in §73.1650, will apply. When overlap would be received from a foreign station, the provisions of this section will apply, except where there would be overlap with a foreign station with a frequency separation of 20 kHz. In the latter case the provisions of the international agreement will apply in lieu of this section.

Note 3: In determining the number of "authorized" aural transmission facilities in a given community, applications for that community in hearing or otherwise having protected status under specified "cut-off" procedures shall be considered as existing stations. In the event that there are two or more mutually exclusive protected applications seeking authorization for the proposed community it will be assumed that only one is "authorized."

Note 4: A "transmission facility" for a community is a station licensed to the community. Such a station provides a "transmission service" for that community.

17. In Section 73.53, paragraph (b)(1) is revised and a new Note is added after paragraph (c) to read as follows:

§73.53 Requirements for authorization of antenna monitors.

* * * * *

(b) * * *

(1) The monitor shall be designed to operate in the 535-1705 kHz band.

* * * * *

Note: In (b)(1) above, the requirement that monitors be capable of operation in the 535-1705 kHz band shall apply only to equipment manufactured after July 1, 1991. Use of a monitor in the 1605-1705 kHz band which is not approved for such operation will be permitted pending the general availability of 535-1705 kHz band monitors if a manufacturer can demonstrate, in the interim, that its

monitor performs in accordance with the standards in this section on these 10 channels.

18. In Section 73.68, paragraph (d)(3) is revised to read as follows:

§73.68 Sampling systems for antenna monitors.

* * * * *

(d) * * *

(3) If that portion of the sampling system above the base of the towers is modified or components replaced, a partial proof of performance shall be executed in accordance with §73.154 subsequent to these changes. The partial proof of performance shall be accompanied by common point impedance measurements made in accordance with §73.54.

* * * * *

19. In Section 73.69, paragraph (d)(4) is revised to read as follows:

§73.69 Antenna monitors.

* * * * *

(d) * * *

(4) If it cannot be established by the observations required in paragraph (d)(2) of this section that base current ratios and monitoring point values are within the tolerances or limits prescribed by the rules and the instrument of authorization, or if the substitution of the new antenna monitor for the old results in changes in these parameters, a partial proof of performance shall be executed and analyzed in accordance with §73.154.

* * * * *

20. In Section 73.72, paragraph (a) is revised to read as follows:

§73.72 Operating during the experimental period.

(a) An AM station may operate during the experimental period (the time between midnight and sunrise, local time) on its assigned frequency and with its authorized power for the routine testing and maintenance of its transmitting system, and for conducting experimentation under an experimental authorization, provided no interference is caused to other stations maintaining a regular operating schedule within such period.

* * * * *

21. In Section 73.88, a new Note is added after the introductory language to read as follows:

§73.88 Blanketing interference.

* * * * *

Note: For more detailed instructions concerning operational responsibilities of licensees and permitees under this section, see §73.318 (b), (c) and (d).

22. Section 73.99 is revised to read as follows:

§73.99 Presunrise service authorization (PSRA) and Postsunset service authorization (PSSA).

(a) To provide maximum uniformity in early morning operation compatible with interference considerations, and to provide for additional service during early evening hours for Class D stations, provisions are made for presunrise service and postsunset service. The permissible power for presunrise or postsunset service authorizations shall not exceed 500 watts, or the authorized daytime or critical hours power (whichever is less). Calculation of the permissible power shall consider only co-channel stations for interference protection purposes.

(b) Presunrise service authorizations (PSRA) permit:

(1) Class D stations operating on Mexican, Bahamian, and Canadian Class A clear channels to commence PSRA operation at 6:00 a.m. local time and to continue such operation until the sunrise times specified in their basic instruments of authorization.

(2) Class D stations situated outside 0.5 mV/m-50% skywave contours of co-channel domestic Class A stations to commence PSRA operation at 6:00 a.m. local time and to continue such operation until sunrise times specified in their basic instruments of authorization.

(3) Class D stations located within co-channel 0.5 mV/m-50% skywave contours of domestic Class A stations, to commence PSRA operation either at 6:00 a.m. local time, or at sunrise at the nearest Class A station located east of the Class D station (whichever is later), and to continue such operation until the sunrise times specified in their basic instruments of authorization.

(4) Class B and D stations on regional channels to commence PSRA operation at 6.00 a.m. local time and to continue such operation until local sunrise times specified in their basic instruments of authorization.

(c) Extended Daylight Saving Time Pre-Sunrise Authorizations:

(1) Between the first Sunday in April and the end of the month of April, Class D stations will be permitted to conduct pre-sunrise operation beginning at 6:00 a.m. local time with a maximum power of 500 watts (not to exceed the

station's regular daytime or critical hours power), reduced as necessary to comply with the following requirements:

(i) Full protection is to be provided as specified in applicable international agreements.

(ii) Domestic protection is to be provided to the 0.5 mV/m groundwave signals of co-channel Class A stations, but protection to the 0.5 mV/m-50% skywave contours of these stations is not required.

(iii) In determining the protection to be provided, the effect of each interfering signal will be evaluated separately. The presence of interference from other stations will not reduce or eliminate the required protection.

(iv) Notwithstanding the requirements of paragraph (c)(1)(ii) and (iii) of this section, the stations will be permitted to operate with a minimum power of 10 watts unless a lower power is required by international agreement.

(2) The Commission will issue appropriate authorizations to Class D stations not previously eligible to operate during this period. Class D stations authorized to operate during this pre-sunrise period may continue to operate under their current authorization.

(d) Postsunset service authorizations (PSSA) permit:

(1) Class D stations located on Mexican, Bahamian, and Canadian Class A clear channels to commence PSSA operation at sunset times specified in their basic instruments of authorization and to continue for two hours after such specified times.

(2) Class D stations situated outside 0.5 mV/m-50% skywave contours of co-channel domestic Class A stations to commence PSSA operations at sunset times specified in their basic instruments of authorization and to continue up to two hours after such specified times.

(3) Class D stations located within co-channel 0.5 mV/m-50% skywave contours of domestic Class A stations to commence PSSA operation at sunset times specified in their basic instruments of authorization and to continue such operation until two hours past such specified times, or until sunset at the nearest Class A station located west of the Class D station, whichever is earlier. Class D stations located west of the Class A station do not qualify for PSSA operation.

(4) Class D stations on regional channels to commence PSSA operation at sunset times specified on their basic instruments of authorization and to continue such operation until two hours past such specified times.

(e) Procedural Matters. (1) Applications for PSRA and PSSA operation are not required. Instead, the FCC will calculate the periods of such operation

and the power to be used pursuant to the provisions of this section and the protection requirements contained in applicable international agreements. Licensees will be notified of permissible power and times of operation. Presunrise and Postsunset service authority permits operation on a secondary basis and does not confer license rights. No request for such authority need be filed. However, stations intending to operate PSRA or PSSA shall submit by letter, signed as specified in §73.3513, the following information:

(i) Licensee name, station call letters and station location,

(ii) Indication as to whether PSRA operation, PSSA operation, or both, is intended by the station,

(iii) A description of the method whereby any necessary power reduction will be achieved.

(2) Upon submission of the required information, such operation may begin without further authority.

(f) Technical Criteria. Calculations to determine whether there is objectionable interference will be determined in accordance with the AM Broadcast Technical Standards, §§73.182 through 73.190, and applicable international agreements. Calculations will be performed using daytime antenna systems, or critical hours antenna systems when specified on the license. In performing calculations to determine assigned power and times for commencement of PSRA and PSSA operation, the following standards and criteria will be used:

(1) Class D stations operating in accordance with paragraphs (b)(1), (b)(2), (d)(1), and (d)(2) of this section are required to protect the nighttime 0.5 mV/m-50% skywave contours of co-channel Class A stations. Where a 0.5 mV/m-50% skywave signal is not produced, the 0.5 mV/m groundwave contour shall be protected.

(2) Class D stations are required to fully protect foreign Class B and C stations when operating PSRA and PSSA; Class D stations operating PSSA are required to fully protect domestic Class B stations. For purposes of determining protection, the nighttime RSS limit will be used in the determination of maximum power permissible.

(3) Class D stations operating in accordance with paragraphs (d)(2) and (d)(3) of this section are required to restrict maximum 10% skywave radiation at any point on the daytime 0.1 mV/m groundwave contour of a co-channel Class A station to 25 μV/m. The location of the 0.1 mV/m contour of the Class A station will be determined by use of Figure M3, Estimated Ground Conductivity in the United States. When the 0.1 mV/m contour extends beyond the national boundary, the international boundary shall be considered the 0.1 mV/m contour.

(4) Class B and D stations on regional channels operating PSRA and PSSA (Class D only) are required to provide full protection to co-channel foreign Class B and C stations.

(5) Class D stations on regional channels operating PSSA beyond 6:00 p.m. local time are required to fully protect domestic Class B stations.

(6) The protection that Class D stations on regional channels are required to provide when operating PSSA until 6:00 p.m. local time is as follows:

(i) For the first half-hour of PSSA operation, protection will be calculated at sunset plus 30 minutes at the site of the Class D station;

(ii) For the second half-hour of PSSA operation, protection will be calculated at sunset plus one hour at the site of the Class D station;

(iii) For the second hour of PSSA operation, protection will be calculated at sunset plus two hours at the site of the Class D station;

(iv) Minimum powers during the period until 6:00 p.m. local time shall be permitted as follows:

Calculated power	Adjusted minimum power
From 1 to 45 watts	50 watts
Above 45 to 70 watts	75 watts
Above 70 to 100 watts	100 watts

(7) For protection purposes, the nighttime RSS limit will be used in the determination of maximum power permissible.

(g) Calculations made under paragraph (d) of this section may not take outstanding PSRA or PSSA operations into account, nor will the grant of a PSRA or PSSA confer any degree of interference protection on the holder thereof.

(h) Operation under a PSRA or PSSA is not mandatory, and will not be included in determining compliance with the requirements of §73.1740. To the extent actually undertaken, however, presunrise operation will be considered by the FCC in determining overall compliance with past programming representations and station policy concerning commercial matter.

(i) The PSRA or PSSA is secondary to the basic instrument of authorization with which it is to be associated. The PSRA or PSSA may be suspended, modified, or withdrawn by the FCC without prior notice or right to hearing,

if necessary to resolve interference conflicts, to implement agreements with foreign governments, or in other circumstances warranting such action. Moreover, the PSRA or PSSA does not extend beyond the term of the basic authorization.

(j) The Commission will periodically recalculate maximum permissible power and times for commencing PSRA and PSSA for each Class D station operating in accordance with paragraph (c) of this section. The Commission will calculate the maximum power at which each individual station may conduct presunrise operations during extended daylight saving time and shall issue conforming authorizations. These original notifications and subsequent notifications should be associated with the station's authorization. Upon notification of new power and time of commencing operation, affected stations shall make necessary adjustments within 30 days.

(k) A PSRA and PSSA does not require compliance with §§73.45, 73.182 and 73.1560 where the operation might otherwise be considered as technically substandard. Further, the requirements of paragraphs (a)(5), (b)(2), (c)(2), and (d)(2) of §73.1215 concerning the scale ranges of transmission system indicating instruments are waived for PSRA and PSSA operation except for the radio frequency ammeters used in determining antenna input power.

(l) A station having an antenna monitor incapable of functioning at the authorized PSRA and PSSA power when using a directional antenna shall take the monitor reading using an unmodulated carrier at the authorized daytime power immediately prior to commencing PSRA or PSSA operations. Special conditions as the FCC may deem appropriate may be included for PSRA or PSSA to insure operation of the transmitter and associate equipment in accordance with all phases of good engineering practice.

23. Section 73.150 is amended by revising paragraphs (a), (b)(1), (b)(2), (b)(3), (b)(5)(iv), (b)(5)(v), and (b)(6)(vii), and equation 2, by changing all references to miles in paragraph (b)(1)(i) to kilometers, and by revising the formulas in paragraph (b)(1)(i) to read as follows:

§73.150 Directional antenna systems.

(a) For each station employing a directional antenna, all determinations of service provided and interference caused shall be based on the inverse fields of the standard radiation pattern for that station. (As applied to nighttime operation the term "standard radiation pattern" shall include the radiation pattern in the horizontal plane, and radiation patterns at angles above this plane.)

* * * * *

(b) * * *

(1) The standard radiation pattern for the proposed antenna in the horizontal plane, and where pertinent, tabulated values for the azimuthal radiation patterns for angles of elevation up to and including 60 degrees, with a separate section for each increment of 5 degrees.

(i) * * *

where:

$E(\phi,\theta)_{th}$ Represents the theoretical inverse distance fields at one kilometer for the given azimuth and elevation.

* * *

The standard radiation pattern shall be constructed in accordance with the following mathematical expression:

$$E(\phi,\theta)_{std} = 1.05\sqrt{[E(\phi,\theta)_{th}]^2 + Q^2} \quad \text{(Eq. 2)}$$

where:

$E(\phi,\theta)_{std}$ Represents the inverse fields at one kilometer which are deemed to be produced by the directional antenna in the horizontal and vertical planes.

$E(\phi,\theta)_{th}$ Represents the theoretical inverse distance fields at one kilometer as computed in accordance with Eq. 1, above.

Q is the greater of the following quantities:

$$0.025\ g(\theta)\ E_{rss}$$

or

$$10.0\ g(\theta)\sqrt{P_{kW}}$$

* * * * *

(ii) * * *

(2) All patterns shall be computed for integral multiples of five degrees, beginning with zero degrees representing true north, and, shall be plotted to the largest scale possible on unglazed letter-size paper (main engraving

approximately 7" x 10") using only scale divisions and subdivisions of 1, 2, 2.5, or 5 times 10^{nth}. The horizontal plane pattern shall be plotted on polar coordinate paper, with the zero degree point corresponding to true north. Patterns for elevation angles above the horizontal plane may be plotted in polar or rectangular coordinates, with the pattern for each angle of elevation on a separate page. Rectangular plots shall begin and end at true north, with all azimuths labelled in increments of not less than 20 degrees. If a rectangular plot is used, the ordinate showing the scale for radiation may be logarithmic. Such patterns for elevation angles above the horizontal plane need be submitted only upon specific request by Commission staff. Minor lobe and null detail occurring between successive patterns for specific angles of elevation need not be submitted. Values of field strength on any pattern less than ten percent of the maximum field strength plotted on that pattern shall be shown on an enlarged scale. Rectangular plots with a logarithmic ordinate need not utilize an expanded scale unless necessary to show clearly the minor lobe and null detail.

(3) The effective (RMS) field strength in the horizontal plane of $\mathbf{E}(\theta,\theta)_{std}$, $\mathbf{E}(\phi,\theta)_{th}$ and the root sum square (RSS) value of the inverse fields of the array elements at 1 kilometer, derived from the equation for $\mathbf{E}(\phi.\theta)_{th}$. . These values shall be tabulated on the page on which the horizontal plane pattern is plotted, which shall be specifically labelled as the Standard Horizontal Plane Pattern.

(4) * * *

(5) * * *

(iv) Where waiver of the content of this section is requested or upon request of the Commission staff, all assumptions made and the basis therefor, particularly with respect to the electrical height of the elements, current distribution along elements, efficiency of each element, and ground conductivity.

(v) Where waiver of the content of this section is requested, or upon request of the Commission staff, those formulas used for computing $\mathbf{E}(\phi,\theta)_{th}$ and $\mathbf{E}(\phi.\theta)_{std}$. Complete tabulation of final computed data used in plotting patterns, including data for the determination of the RMS value of the pattern, and the RSS field of the array.

(6) * * *

(vii) Additional requirements relating to modified standard patterns appear in Section 73.152(c)(3) and (c)(4).

* * * * *

24. Section 73.151 is amended by adding a new paragraph (b) to read as follows:

§73.151 Field strength measurements to establish performance of directional antennas.

* * * * *

(b) For directional stations authorized to operate in the 1605-1705 kHz band, the measurements to support pattern RMS compliance referred to in (a)(1)(ii) and (a)(1)(iii) are not required.

25. Section 73.152 is amended by adding new paragraphs (c)(2)(iv), (c)(2)(iv)(A), and (c)(2)(iv)(B).

§73.152 Modification of directional antenna data

* * * * *

(c)(2)(iv) Where the measured inverse distance field exceeds the value permitted by the standard pattern, and augmentation is allowable under the terms of this section, the requested amount of augmentation shall be centered upon the azimuth of the radial upon which the excessive radiation was measured and shall not exceed the following:

(A) the actual measured inverse distance field value, where the radial does not involve a required monitoring point.

(B) 20% above the actual measured inverse field value, where the radial has a monitoring point required by the instrument of authorization.

Whereas some pattern smoothing can be accommodated, the extent of the requested span(s) shall be minimized and in no case shall a requested augmentation span extend to a radial azimuth for which the analyzed measurement data does not show a need for augmentation.

* * * * *

26. Section 73.153 is amended by revising the last sentence in the paragraph to read as follows:

§73.153 Field strength measurements in support of applications or evidence at hearings.

* * * The antenna resistance measurements required by Section 73.186 need not be taken or submitted.

27. Section 73.182 is revised to read as follows:

§73.182 Engineering standards of allocation.

(a) §§73.21 to 73.37, inclusive, govern allocation of facilities in the AM broadcast band 535-1705 kHz. §73.21 establishes three classes of channels in this band, namely, clear, regional and local. The classes and power of AM broadcast stations which will be assigned to the various channels are set forth in §73.21. The classifications of the AM broadcast stations are as follows:

(1) Class A stations operate on clear channels with powers of not less than 10kW and not more than 50 kW. These stations are designed to render primary and secondary service over an extended area, hence have their primary service areas free from objectionable interference from other stations on the same and adjacent channels. Their secondary service areas are protected from objectionable interference from stations on the same and adjacent channels. For purposes of protection, Class A stations may be divided into two groups, those located in any of the contiguous 48 States and those located in Alaska in accordance with the assignment to channels allocated by §73.25.

(i) The mainland U.S. Class A stations are those assigned to the channels allocated by §73.25. The power of these stations shall be 50 kW. The Class A stations in this group are afforded protection as follows:

(A) Daytime. To the 0.1 mV/m groundwave contour from stations on the same channel, and to the 0.5 mV/m groundwave contour from stations on adjacent channels.

(B) Nighttime. To the 0.5 mV/m 50% skywave contour from stations on the same and adjacent channels.

(ii) The Alaskan Class A stations operate on the channels allocated by §73.25 with a minimum power of 10 kW and a maximum power of 50 kW, antenna efficiency of 175 mV/m for 1 kW. Stations operating on these channels in Alaska which have not been designated as Class A stations in response to licensee request will continue to be considered as Class B stations. During daytime hours an Alaskan Class A station receives protection to the 100 μV/m groundwave contour from co-channel stations. During nighttime hours an Alaskan Class A station receives protection to the 100 μV/m-50 percent skywave contour from co-channel and adjacent channel stations. Protection is given to the 0.5 mV/m groundwave contour from stations on adjacent channels for day operation.

NOTE: In the Report and Order in MM Docket No. 83-807, the Commission designated 15 stations operating on U.S. clear channels as Alaskan Class A stations. Eleven of these stations already have Alaskan Class A facilities and are to be protected accordingly. Permanent designation of the other four stations as Alaskan Class A is conditioned on their constructing minimum Alaskan Class A facilities no later than December 31, 1989. During this period, until such facilities are obtained, temporary designation as Alaskan Class A stations shall be applied, and calculations involving these stations should be based on existing facilities but with an assumed power of 10 kW.

Thereafter, these stations are to be protected based on their actual Alaskan Class A facilities. If any of these stations does not obtain Alaskan Class A facilities in the period specified, it is to be protected as a Class B station based on its actual facilities. These four stations may increase power to 10 kW without regard to the impact on Class B co-channel stations. However, increases by these stations beyond 10 kW (or by existing Alaskan Class A stations beyond their current power level) are subject to applicable protection requirements for co-channel Class B stations. Other stations not on the original list but which meet applicable requirements may obtain Alaskan Class A status by seeking such designation from the Commission. If a power increase or other change in facilities by a station not on the original list is required to obtain minimum Alaskan Class A facilities, any such application shall meet the interference protection requirements applicable to an Alaskan Class A proposal on the channel.

(2) Class B stations are stations which operate on clear and regional channels with powers not less than 0.25 kW nor more than 50 kW. These stations render primary service only, the area of which depends on their geographical location, power, and frequency. It is recommended that Class B stations be so located that the interference received from other stations will not limit the service area to a greater value of groundwave contour than 2.0 mV/m nighttime and to the 0.5 mV/m groundwave contour daytime, which are the values for the mutual protection of this class of stations with other stations of the same class.

NOTE: See §§73.21(b)(1) and 73.26(b) concerning power restrictions and classifications relative to Class B, C, and D stations in Alaska, Hawaii, Puerto Rico and the U.S. Virgin Islands. Stations in the above-named places that are reclassified from Class C to Class B stations under §73.26(b) shall not be authorized to increase power to levels that would increase the nighttime interference-free limit of co-channel Class C stations in the conterminous United States.

(3) Class C stations operate on local channels, normally rendering primary service to a community and the suburban or rural areas, contiguous thereto, with powers not less than 0.25 kW, nor more than 1 kW, except as provided in §73.21(c)(1). Such stations are normally protected to the daytime 0.5 mV/m contour. On local channels the separation required for the daytime protection shall also determine the nighttime separation. Where directional antennas are employed daytime by Class C stations operating with more than 0.25 kW power, the separations required shall in no case be less than those necessary to afford protection, assuming nondirectional operation with 0.25 kW. In no case will 0.25 kW or greater nighttime power be authorized to a station unable to operate nondirectionally at 0.25 kW in the daytime. The actual nighttime limitation will be calculated. Class C stations in the 48 contiguous United States may during nighttime hours treat all stations assigned in Alaska, Hawaii, Puerto Rico, and the U.S. Virgin Islands on 1230, 1240, 1340, 1400, 1450, and 1490 kHz as if they were Class C stations.

(4) Class D stations operate on clear and regional channels with daytime powers of not less than 0.25 kW (or equivalent RMS field of 141 mV/m at one kilometer if less than 0.25 kW) and not more than 50 kW. Class D stations that have previously received nighttime authority operate with powers of less than 0.25 kW (or equivalent RMS fields of less than 141 mV/m at one kilometer) are not required to provide nighttime coverage in accordance with §73.24(j) and are not protected from interference during nighttime hours. Such nighttime authority is permitted on the basis of full nighttime protection being afforded to all Class A and Class B stations.

(b) When a station is already limited by interference from other stations to a contour of higher value than that normally protected for its class, the individual received limits shall be the established standard for such station with respect to interference from each other station.

(c) The four classes of AM broadcast stations have in general three types of service area, i.e., primary, secondary and intermittent. (See §73.14 for the definitions of primary, secondary, and intermittent service areas.) Class A stations render service to all three areas. Class B stations render service to a primary area but the secondary and intermittent service areas may be materially limited or destroyed due to interference from other stations, depending on the station assignments involved. Class C and D stations usually have only primary service areas. Interference from other stations may limit intermittent service areas and generally prevents any secondary service to those stations which operate at night. Complete intermittent service may still be obtained in many cases depending on the station assignments involved.

(d) The groundwave signal strength required to render primary service is 2 mV/m for communities with populations of 2,500 or more; and 0.5 mV/m for communities with populations of less than 2,500. See §73.184 for curves showing distance to various groundwave field strength contours for different frequencies and ground conductivities, and also see §73.183, "Groundwave signals."

(e) The FCC will authorize the directional antenna for a Class C station for daytime operation only with power in excess of 0.25 kW. In computing the degrees of protection which such antenna will afford, the radiation produced by this antenna will be assumed to be no less, in any direction, than that which would result from non-directional operation using a single element of the directional array, with 0.25 kW.

(f) All classes of broadcast stations have primary service areas subject to limitation by fading and noise, and interference from other stations to the contours set out for each class of station.

(g) Secondary service is delivered during nighttime hours in the areas where the skywave for 50% or more of the time has a field strength of 0.5 mV/m or greater (0.1 mV/m in Alaska). It is not considered that satisfactory secondary service can be rendered to cities unless the skywave approaches in

value the groundwave required for primary service. The secondary service is necessarily subject to some interference and extensive fading whereas the primary service area of a station is subject to no objectionable interference or fading. Only Class A stations are assigned on the basis of rendering secondary service.

Note: Standards have not been established for objectionable fading as such standards would necessarily depend on receiver characteristics. Selective fading causing audio distortion and the signal fading below the noise level are the objectionable characteristics of fading on modern design receivers. The AVC circuits in the better designed receivers in general maintain the audio output sufficiently constant to be satisfactory during most fading.

(h) The intermittent service is rendered by the groundwave and begins at the outer boundary of the primary service area and extends to the value of signal where it may be considered as having no further service value. This may be down to only a few μV/m in certain areas and up to several millivolts in other areas of high noise level, interference from other stations, or objectionable fading at night. The intermittent service area may vary widely from day to night and generally varies from time to time. Only Class A stations are assigned for protection from interference from other stations into the intermittent service area.

(i) Broadcast stations are licensed to operate unlimited time, limited time, daytime, share time, and specified hours. (See §73.1710, 73.1725, 73.1720, 73.1715, and 73.1730.) Applications for new stations shall specify unlimited time operation only.

(j) §73.24 sets out the general requirements for obtaining an increase in facilities of a licensed station and for a new station. §§73.24(b) and 73.37 concern the matter of interference that may be caused by a new assignment or increase in facilities of an existing assignment. §73.30 describes the method to determine eligibility for operation in the 1605-1705 kHz band.

(k) Objectionable nighttime interference from another broadcast station is the degree of interference produced when, at a specified field strength contour with respect to the desired station, the field strength of an undesired station (on the same frequency and/or on the two first adjacent channels, after application of proper protection ratio) exceeds for 10% or more of the time the values set forth in these standards. The value derived from the root-sum-square of all contributions can then be used to determine the extent of a station's interference-free coverage.

(l) With respect to the root-sum-square values of interfering field strengths referred to in this section, calculation is accomplished by considering the signals on the three channels of concern (co- and first adjacencies) in order of decreasing magnitude, adding the squares of the values and extracting the square root of the sum.

(2) For purposes of simplification, the RSS value may be considered to be stabilized when, by following the order in (k)(1), an interfering signal is added which does not change the value of the second decimal place figure of the cumulative RSS value of the interference from existing stations, and which at the same time is not greater than the smallest signal already included in the RSS value of interference from existing stations. However, where further accuracy is required, a calculation including all contributing signals will govern.

(l) Objectionable nighttime interference from a station shall be considered to exist to a station when, at the field strength contour specified in paragraph (q) of this section with respect to the class to which the station belongs, the field strength of an interfering station operating on the same channel or on a first adjacent channel after signal adjustment using the proper protection ratio, exceeds for 10% or more of the time the value of the permissible interfering signal set forth opposite such class in paragraph (q) of this section.

(m) For the purpose of estimating the coverage and the interfering effects of stations in the absence of field strength measurements, use shall be made of Figure 8 of §73.190, which describes the estimated effective field (for 1 kW power input) of simple vertical omnidirectional antennas of various heights with ground systems having at least 120 quarter-wavelength radials. Certain approximations, based on the curve or other appropriate theory, may be made when other than such antennas and ground systems are employed, but in any event the effective field to be employed shall not be less than given in the following:

Class of station	Effective field (at 1 km)
All Class A (except Alaskan)	362 mV/m
Class A (Alaskan), B and D	282 mV/m
Class C	241 mV/m

In case a directional antenna is employed, the interfering signal of a broadcasting station will vary in different directions, being greater than the above values in certain directions and less in others depending upon the design and adjustment of the directional antenna system. To determine the interference in any direction the measured or calculated radiated field (unabsorbed field strength at 1 kilometer from the array) must be used in conjunction with the appropriate propagation curves. (See §73.185 for further discussion and solution of a typical directional antenna case.)

NOTE: For Class B stations in Alaska, Hawaii, Puerto Rico and the U.S. Virgin Islands, 241 mV/m shall be used.

(n) The existence or absence of objectionable groundwave interference from stations on the same or adjacent channels shall be determined by actual measurements made in accordance with the method described in §73.186, or in

the absence of such measurements, by reference to the propagation curves of §73.184. The existence or absence of objectionable interference due to skywave propagation shall be determined by reference to Formula 2 in §73.190.

(o) Computation of Skyway Field Strength Values:

(1) Fifty Percent Skywave Field Strength Values (Clear Channel). In computing the fifty percent skywave field strength values of a Class A clear channel station, use shall be made of Formula 1 of §73.190, entitled "Skywave Field Strength" for 50 percent of the time.

(2) Ten Percent Skywave Field Strength Values. In computing the 10% skywave field strength for stations on a single signal or an RSS basis, Formula 2 in §73.190 shall be used.

(3) Determination of Angles of Departure. In calculating skywave field strength for stations on all channels, the pertinent vertical angle shall be determined by use of the formula in §73.190(d).

(p) The distance to any specified groundwave field strength contour for any frequency may be determined from the appropriate curves in §73.184 entitled "Ground Wave Field Strength vs. Distance."

(q) Protected service contours and permissible interference signals for broadcast stations are as follows (for Class A stations, see paragraph (a) of this section):

Class of station	Class of channel used	Signal strength contour of area protected from objectionable interference 1/ (μV/m)		Permissible interfering signal (μV/m)	
		Day 2/	Night	Day 2/	Night 3/
A	Clear	SC 100 AC 500	SC 500 50% SW AC 500 50% SW	SC 5 AC 79	SC 12.5 AC 125
A(Alaskan)	do	SC 100 AC 500	SC 100 50% SW AC 500	SC 5 AC 79	SC 2 AC 125
B	Clear Regional	500	2000 2/	25 AC 79	50 158
C	Local	500	Not presc. 4/	SC 25	Not presc.
D	Clear Regional	500	Not presc.	SC 25 AC 79	Not presc.

1/ When a station is already limited by interference from other stations to a contour of higher value than that normally protected for its class, this contour shall be the established coverage standard for such station. Changes proposed by a station that already exceeds the value specified in the table shall be required to demonstrate a reduction of the existing interference contribution of at least 10%. In no case will a reduction be required that would result in a value that is below the pertinent value specified in the table.

2/ Groundwave.

3/ Skywave field strength for 10 percent or more of the time.

4/ During nighttime hours, Class C stations in the contiguous 48 States may treat all Class B stations assigned to 1230, 1240, 1340, 1400, 1450 and 1490 kHz in Alaska, Hawaii, Puerto Rico and the U.S. Virgin Islands as if they were Class C stations.

Note: SC = Same channel; AC = Adjacent channel; SW = Skywave

(r) The following table of logarithmic expressions is to be used as required for determining the minimum permissible ratio of the field strength of a

desired to an undesired signal. This table shall be used in conjunction with the protected contours specified in paragraph (q).

Frequency separation of desired to undesired signals (kHz)	Desired groundwave to: Undesired groundwave (dB)	Undesired 10% skywave (dB)	Desired 50% skywave to undesired 10% skywave (dB)
0	26	26	26
10	-16	-16	0

(s) Two stations, one with a frequency twice that of the other, should not be assigned in the same groundwave service area unless special precautions are taken to avoid interference from the second harmonic of the lower frequency. Additionally, in selecting a frequency, consideration should be given to the fact that occasionally the frequency assignment of two stations in the same area may bear such a relation to the intermediate frequency of some broadcast receivers as to cause so-called "image" interference. However, since this can usually be rectified by readjustment of the intermediate frequency of such receivers, the Commission, in general, will not take this kind of interference into consideration when authorizing stations.

(t) Two stations operating with synchronized carriers and carrying the identical program will have their groundwave service subject to some distortion in areas where the signals from the two stations are of comparable strength. For the purpose of estimating coverage of such stations, areas in which the signal ratio is between 1 to 2 and 2 to 1 will not be considered as having satisfactory service.

Note: Two stations are considered to be operated synchronously when the carriers are maintained within 0.2 Hz of each other and they transmit identical programs.

28. Section 73.183 is amended by removing paragraph (b) and adding the note that follows paragraph (a), and by redesignating paragraphs (c) through (f) as (b) through (e), and revising new paragraphs (c) and (e) to read as follows:

§73.183 Groundwave signals.

(a) * * *

Note: Groundwave field strength measurements will not be accepted or considered for the purpose of establishing that interference to a station in a foreign country other than Canada, or that signal strength at the border thereof, would be less than indicated by the application of the ground conductivity maps and engineering standards contained in this part and applicable international agreements. Satisfactory groundwave measurements offered for the purpose of demonstrating values of conductivity other than

those shown by Figure M3 in problems involving protection of Canadian stations will be considered only if, after review thereof, the appropriate agency of the Canadian government notifies the Commission that they are acceptable for such purpose.

* * * * *

(c) Example of determining interference by the graphs in §73.184:

It is desired to find whether objectionable interference may exist between a proposed 5 kW Class B station on 990 kHz and an existing 1 kW Class B station on the adjacent channel of 1000 kHz. The spacing between the two stations is 260 kilometers and both stations operate nondirectionally with antenna systems which produce an effective field of 282 mV/m at one kilometer. (See §73.185 in case of use of directional antennas.) The conductivity at each station and of the intervening terrain is determined as 6 mS/m. The protection to Class B stations during daytime is to the 500 μV/m (0.5 mVm) contour using a 16 dB protection factor. The distance to the 500 μV/m groundwave contour of the 1 kW station is determined by the use of the appropriate curve in §73.184. Since the curve is plotted for 100 mV/m at a 1 kilometer, to find the distance to the 0.5 mV/m contour of the 1 kw station, it is necessary to determine the distance to the 0.1773 m/Vm contour.

(100 X 0.5/282 = 0.1773)

Using the 6 mS/m curve, the estimated radius of the 0.5 mV/m contour is seen to be 62.5 kilometers. Subtracting this distance from the distance between the two stations leaves 197.5 kilometers. Using the same propagation curve, the signal from the 5 kW station at this distance is seen to be 0.059 mV/m. Since a protection factor of 16 dB, desired to undesired signal, applies to stations separated by 10 kHz, the undesired signal could have had a value of up to 0.079 mV/m without causing objectionable interference. For co-channel studies, a desired to undesired signal ratio of no less than 20 to 1 (26 dB) is required to avoid causing objectionable interference.

(d) * * *

(e) An example of the use of the equivalent distance method follows:

It is desired to determine the distance to the 0.5 mV/m and 0.025 mV/m contours of a station on a frequency of 1000 kHz with an inverse distance field of 100 mV/m at one kilometer being radiated over a path having a conductivity of 10 mS/m for a distance of 20 kilometers, 5 mS/m for the next 30 kilometers and 15 mSm/m thereafter. Using the appropriate curve in §73.184, Graph 12, at a distance of 20 kilometers on the curve for 10 mS/m it is seen that the field strength is 2.84 mV/m. On the 5mS/m curve, the equivalent distance to this field strength is seen to be 14.92 kilometers, which is 5.08 (20 - 14.92) kilometers nearer to the transmitter. Continuing on the propagation curve, the distance to a field strength of 0.5 mV/m is seen

to be 36.11 kilometers. The actual length of the path travelled, however is 41.19 (36.11 + 5.08) kilometers. Continuing on this propagation curve to the conductivity change at 44.92 (50.00 - 5.08) kilometers, it is seen that the field strength is 0.304 mV/m. On the 15 mS/m propagation curve, the equivalent distance to this field strength is seen to be 82.94 kilometers, which changes the effective path length by 38.02 (82.94 - 44.92) kilometers. Continuing on this propagation curve, the distance to a field strength of 0.025 mV/m is seen to be 224.4 kilometers. The actual length of the path travelled, however, is 191.46 (224.4 + 5.08 - 38.02) kilometers.

29. Section 73.184 is amended by revising paragraph (a) and the note following paragraph (b), removing paragraph (c), and revising and redesignating paragraphs (d), (e), and (f) as (c), (d), and (e), to read as follows:

§73.184 Groundwave field strength charts.

(a) Graphs 1 to 20 show, for each of 20 frequencies, the computed values of groundwave field strength as a function of groundwave conductivity and distance from the source of radiation. The groundwave field strength is here considered to be that part of the vertical component of the electric field which has not been reflected from the ionosphere nor from the troposphere. These 20 families of curves are plotted on log-log graph paper and each is to be used for the range of frequencies shown thereon. Computations are based on a dielectric constant of the ground (referred to air as unity) equal to 15 for land and 80 for sea water and for the ground conductivities (expressed in mS/m) given on the curves. The curves show the variation of the groundwave field strength with distance to be expected for transmission from a vertical antenna at the surface of a uniformly conducting spherical earth with the groundwave constants shown on the curves. The curves are for an antenna power of such efficiency and current distribution that the inverse distance (unattenuated) field is 100 mV/m at 1 kilometer. The curves are valid at distances large compared to the dimensions of the antenna for other than short vertical antennas.

(b) * * *

NOTE: The computed values of field strength versus distance used to plot Graphs 1 to 20 are available in tabular form. Copies of these tabulations may be ordered from the FCC official copy center whose name and address may be obtained by calling or writing the Consumer Affairs Office, Federal Communications Commission, Washington, D.C. 20554, (202) 632-7000.

(c) Provided the value of the dielectric constant is near 15, the curves of Graphs 1 to 20 may be compared with experimental data to determine the appropriate values of the ground conductivity and of the inverse distance field strength at 1 kilometer. This is accomplished simply by plotting the measured fields on transparent log-log graph paper similar to that used for Graphs 1 to 20 and superimposing this chart over the graph corresponding to

the frequency involved. The log-log graph sheet is then shifted vertically until the best fit is obtained with one of the curves on the graph; the intersection of the inverse distance line on the graph with the 1 kilometer abscissa on the chart determines the inverse distance field strength at 1 kilometer. For other values of dielectric constant, the following procedure may be used for a determination of the dielectric constant of the ground, conductivity of the ground and the inverse distance field strength at 1 kilometer. Graph 21 gives the relative values of groundwave field strength over a plane earth as a function of the numerical distance p and phase angle b. On graph paper with coordinates similar to those of Graph 21, plot the measured values of field strength as ordinates versus the corresponding distances from the antenna in kilometers as abscissae. The data should be plotted only for distances greater than one wavelength (or, when this is greater, five times the vertical height of the antenna in the case of a single element, i.e., nondirectional antenna or 10 times the spacing between the elements of a directional antenna) and for distances less than $80f^{1/3}$/mHz kilometers (i.e., 80 kilometers at 1 mHz). Then, using a light box, place the sheet with the data plotted on it over the sheet with the curves of Graph 21 and shift the data sheet vertically and horizontally (making sure that the vertical lines on both sheets are parallel) until the best fit with the data is obtained with one of the curves on Graph 21. When the two sheets are properly lined up, the value of the field strength corresponding to the intersection of the inverse distance line of Graph 21 with the 1 kilometer abscissa on the data sheet is the inverse distance field strength at 1 kilometer, and the values of the numerical distance at 1 kilometer, p_1, and of b are also determined. Knowing the values of b and p_1 (the numerical distance at one kilometer), we may substitute in the following approximate values of the ground conductivity and dielectric constant.

$$\chi \cong \frac{\pi}{p} \cdot \left(R/\lambda \right)_1 \cdot \cos b \qquad \text{(Eq. 1)}$$

$\left(R/\lambda\right)_1$ = Number of wavelengths in 1 kilometer,

* * *

f_{MHz} = frequency expressed in megahertz,

$$\epsilon \cong \chi \tan b - 1 \qquad \text{(Eq. 3)}$$

ϵ = dielectric constant of the ground referred to air as unity.

First solve for χ by substituting the known values of p_1, $(R\iota)_1$, and cos b in equation (1). Equation (2) may then be solved for δ and equation (3) for ϵ. At distances greater than $80/f^{1/3}$ MHz kilometers the curves of Graph 21 do not give the correct relative values of field strength since the curvature of the earth weakens the field more rapidly than these plane

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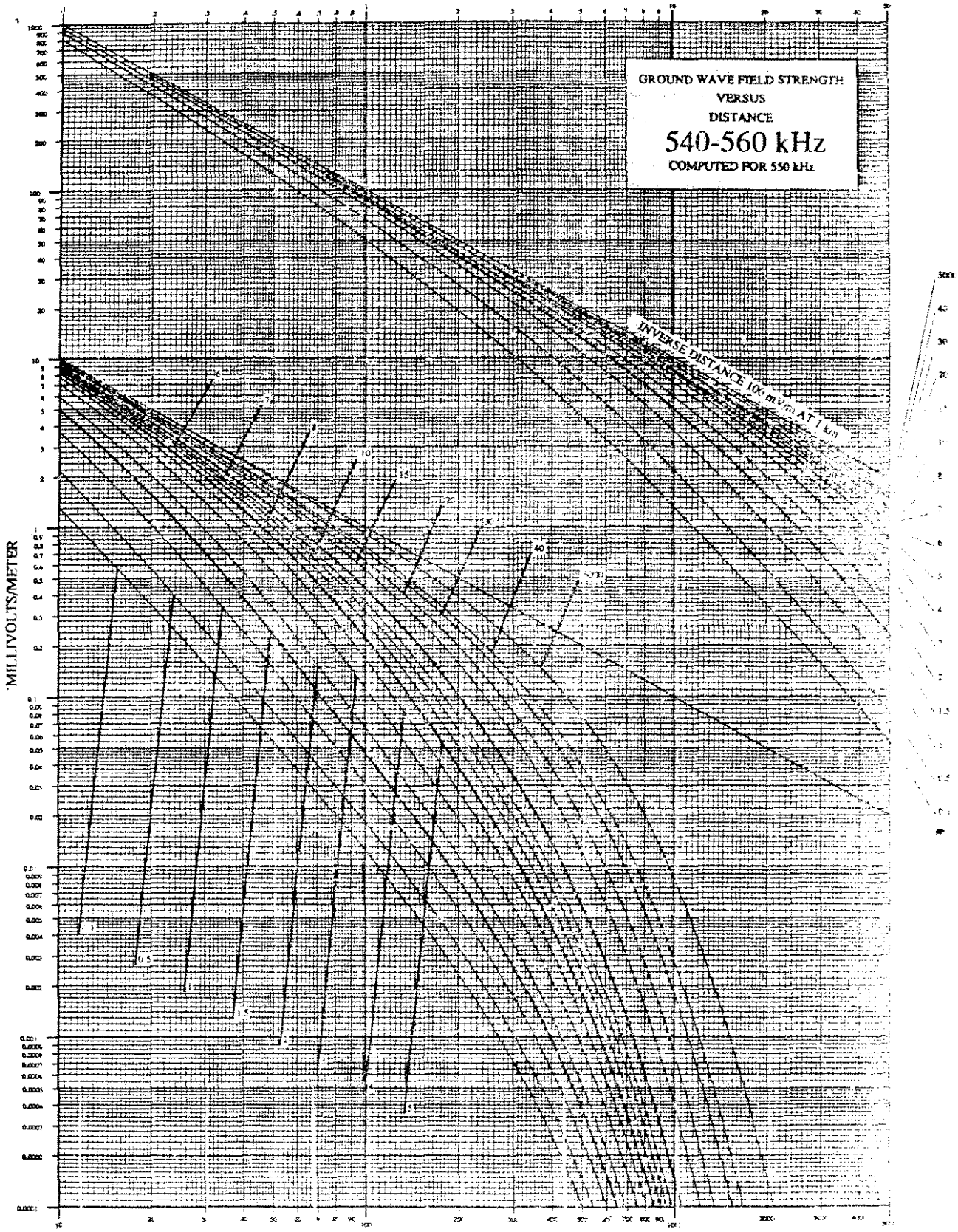

KILOMETERS FROM ANTENNA

GRAPH 1

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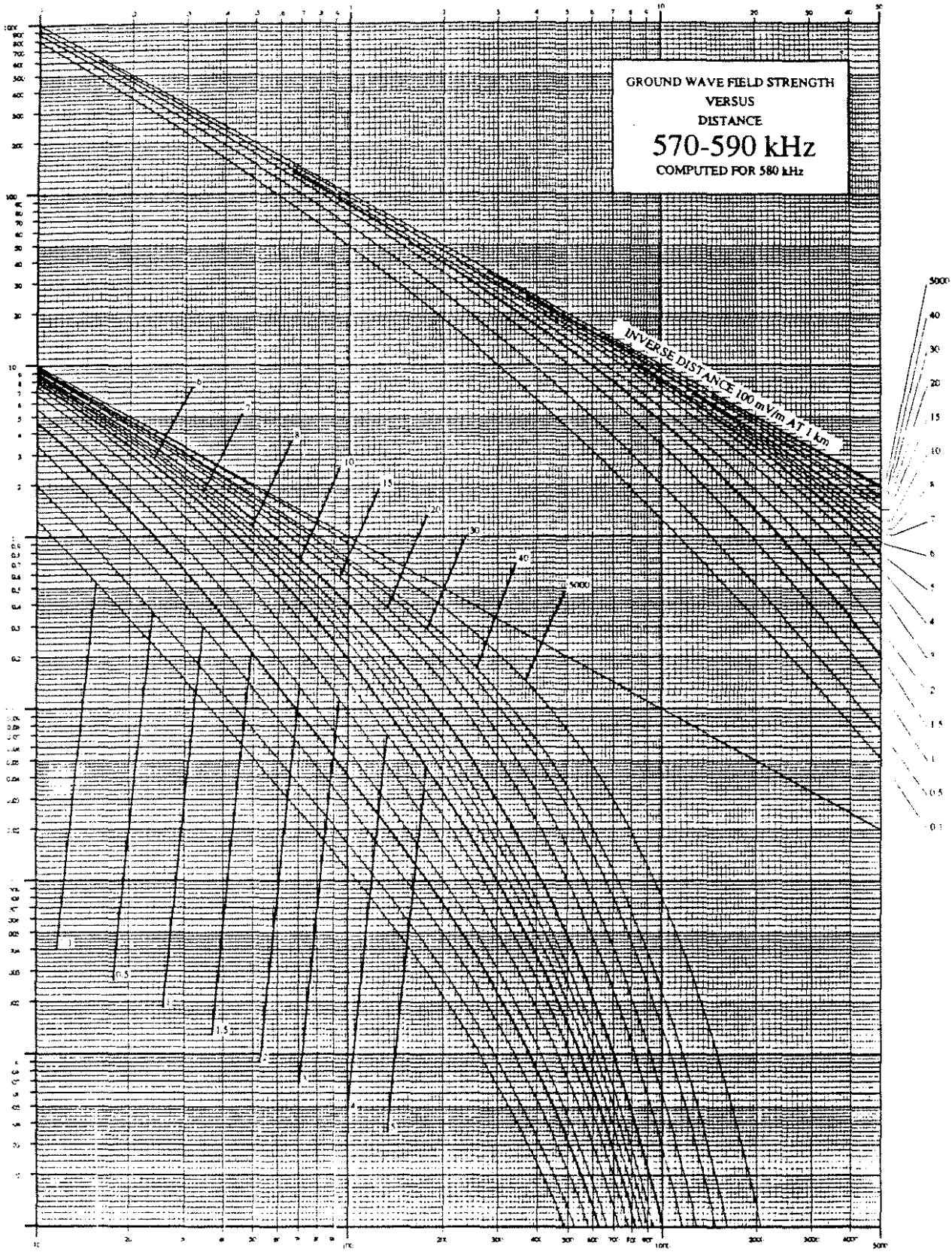

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GRAPH 2

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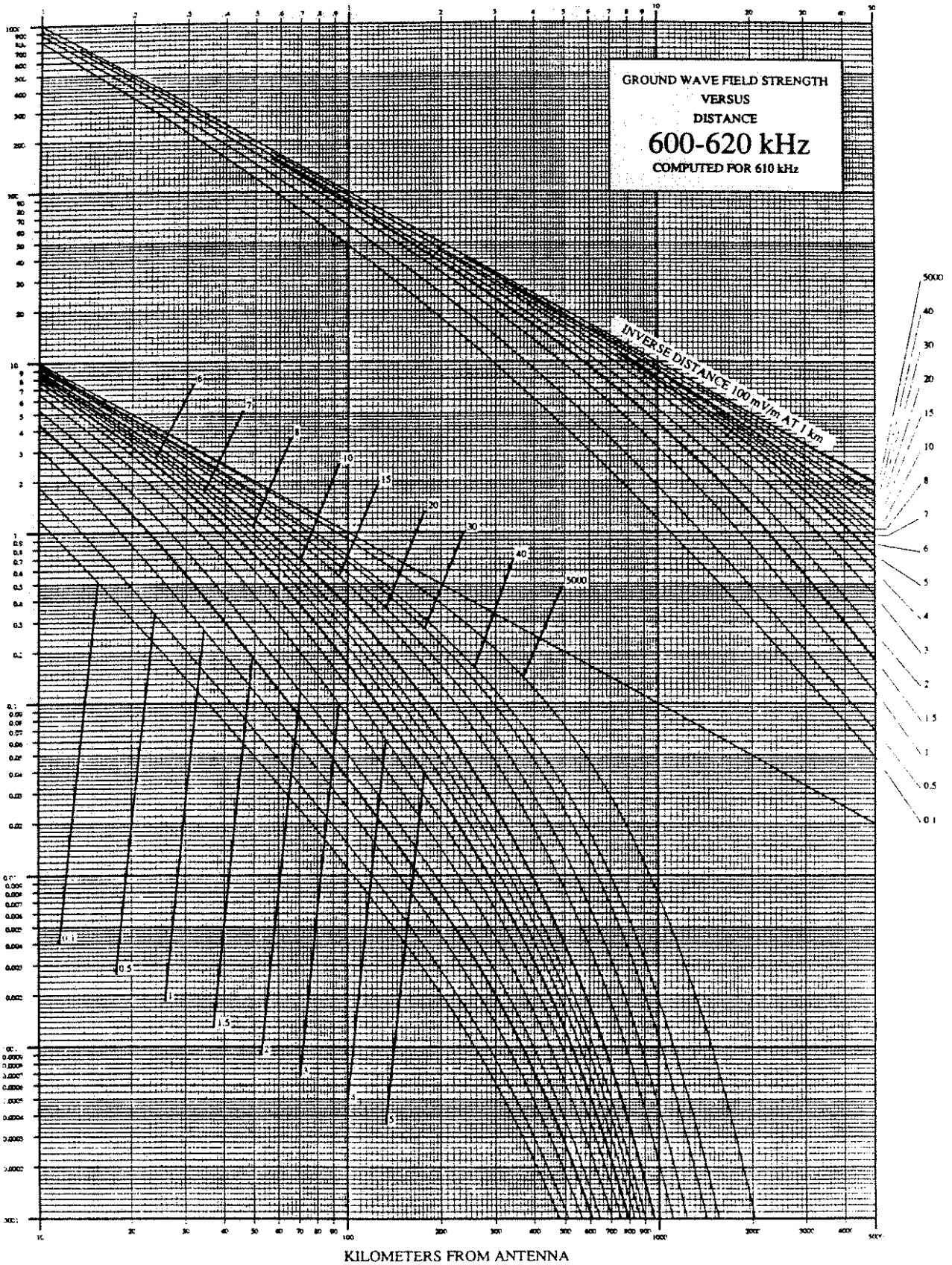

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GRAPH 3

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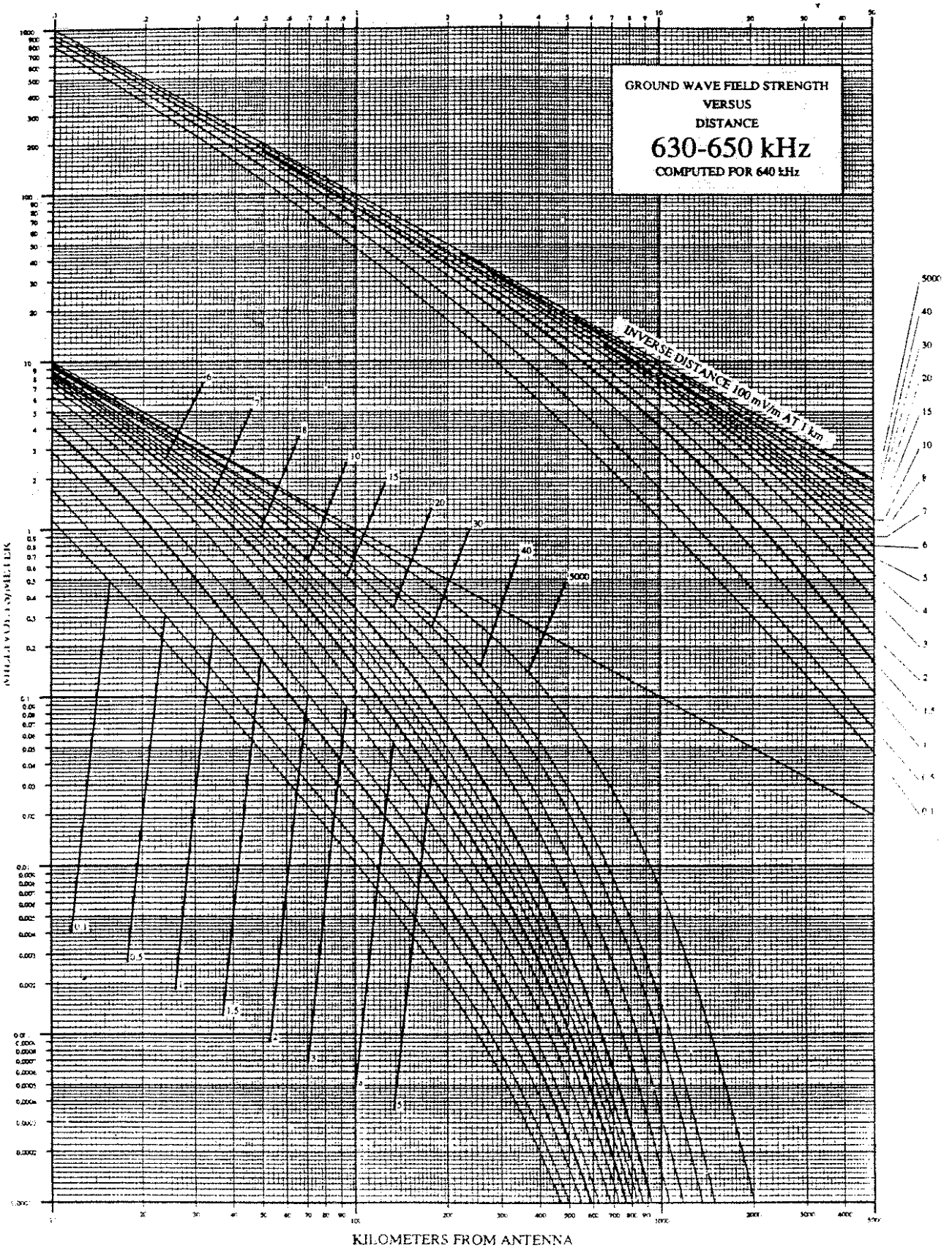

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GRAPH 4

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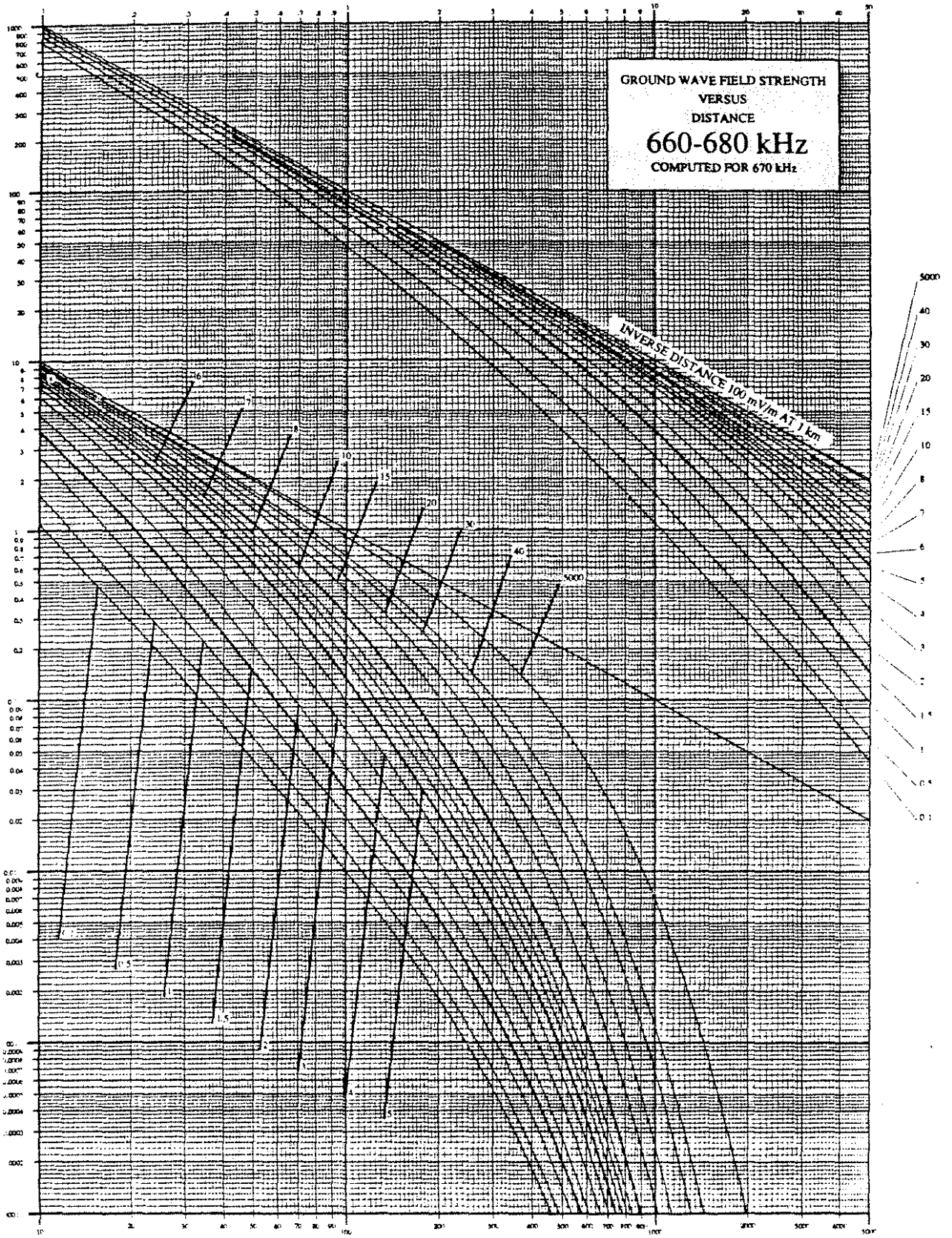

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GRAPH 5

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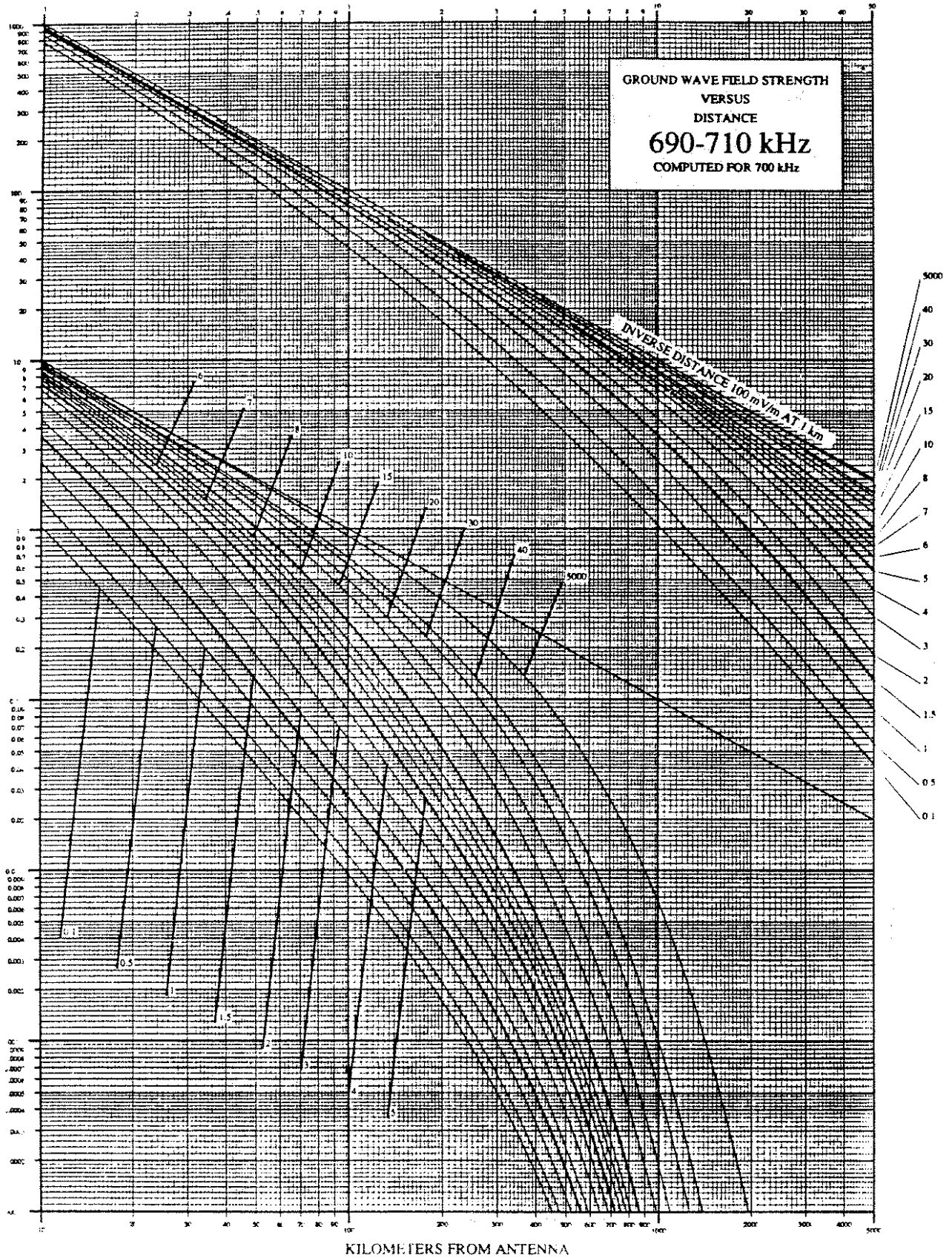

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GRAPH 6

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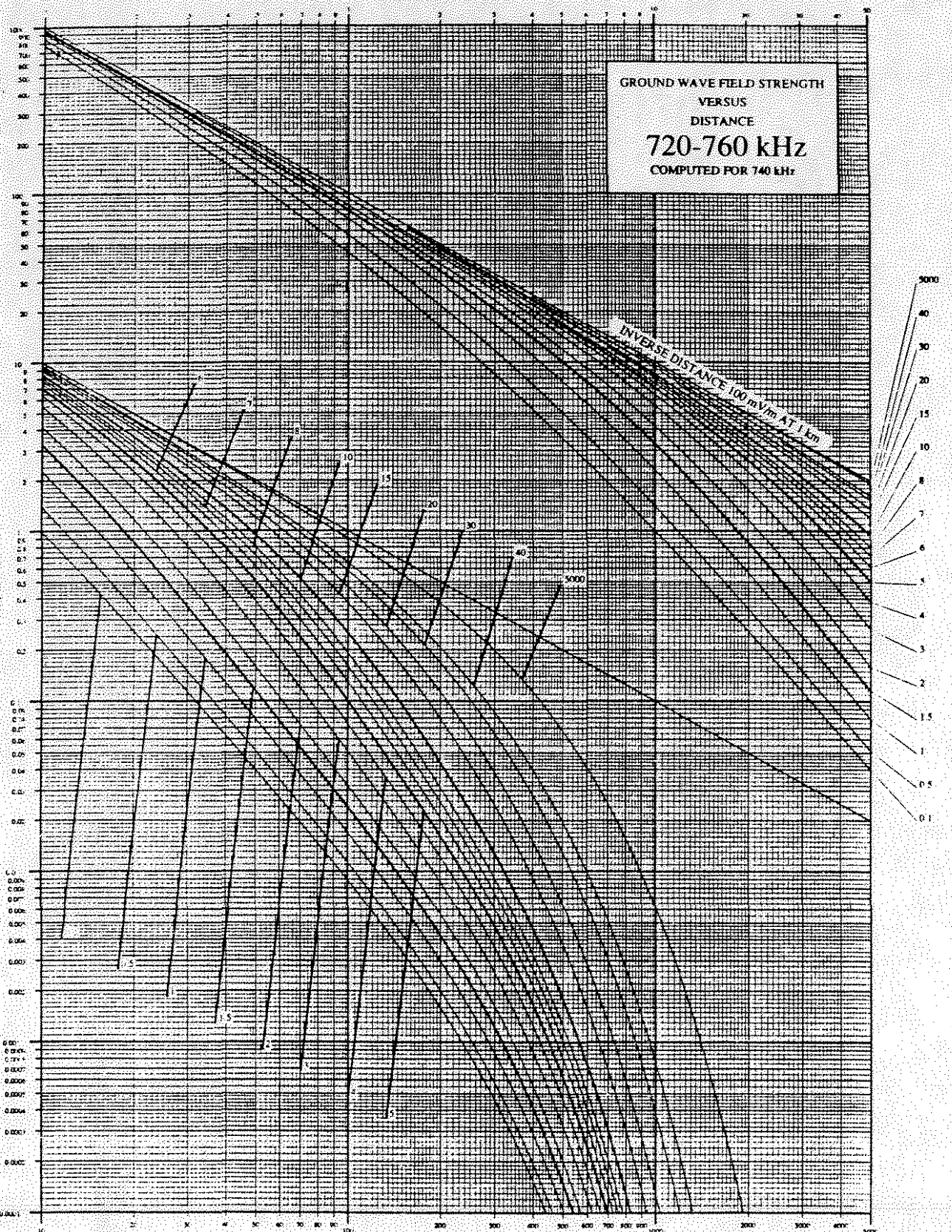

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GRAPH 7

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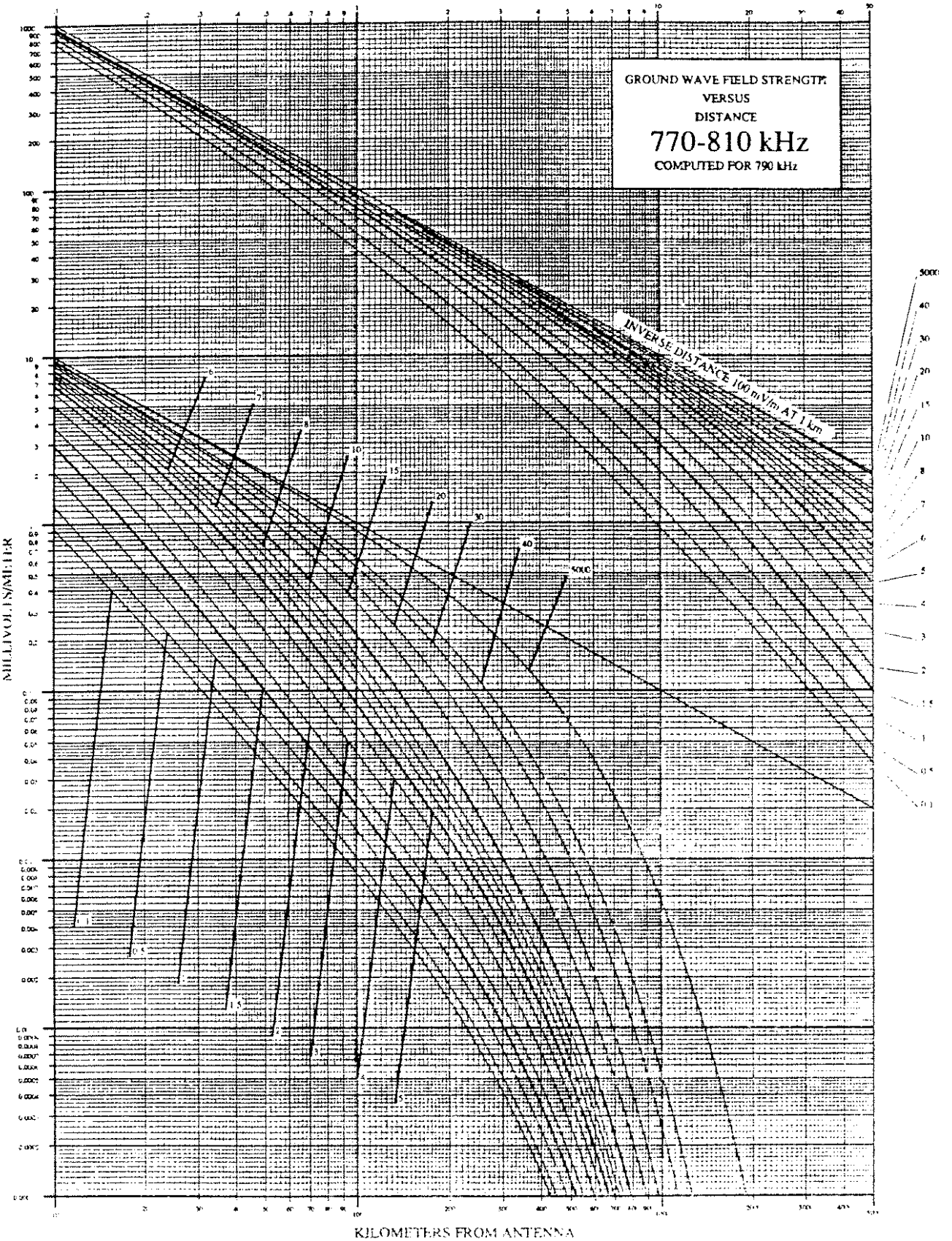

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GRAPH 8

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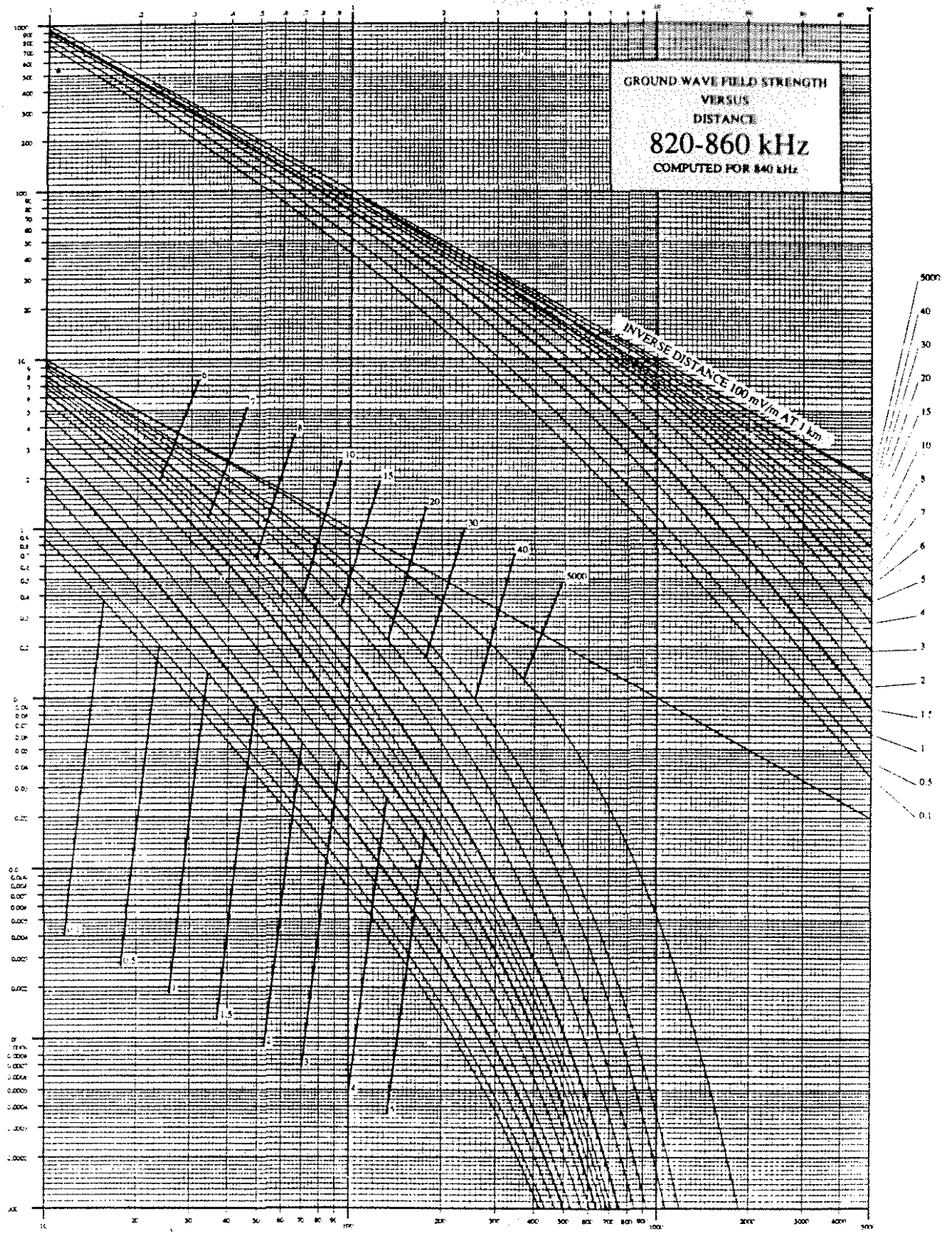

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GRAPH 9

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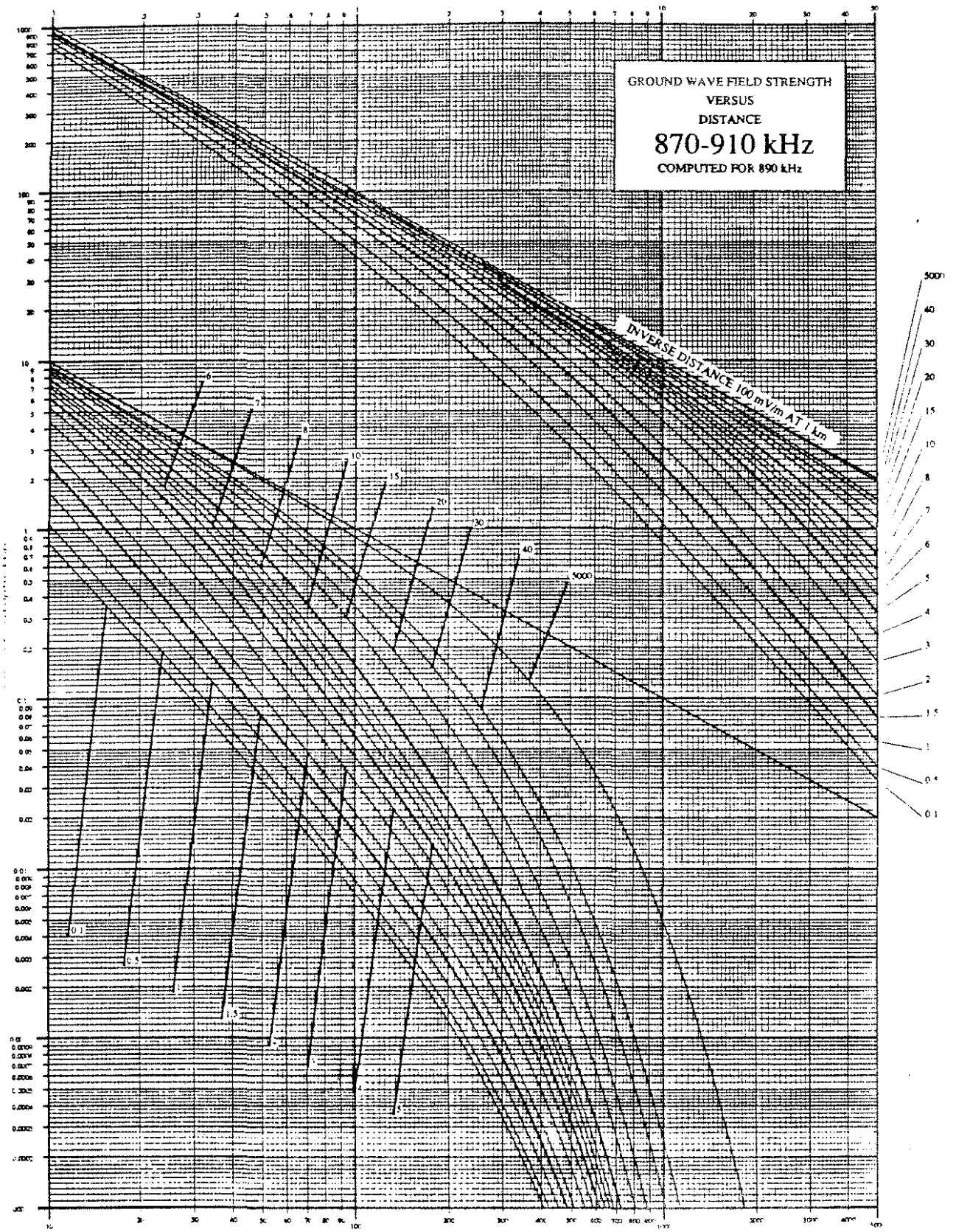

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GRAPH 10

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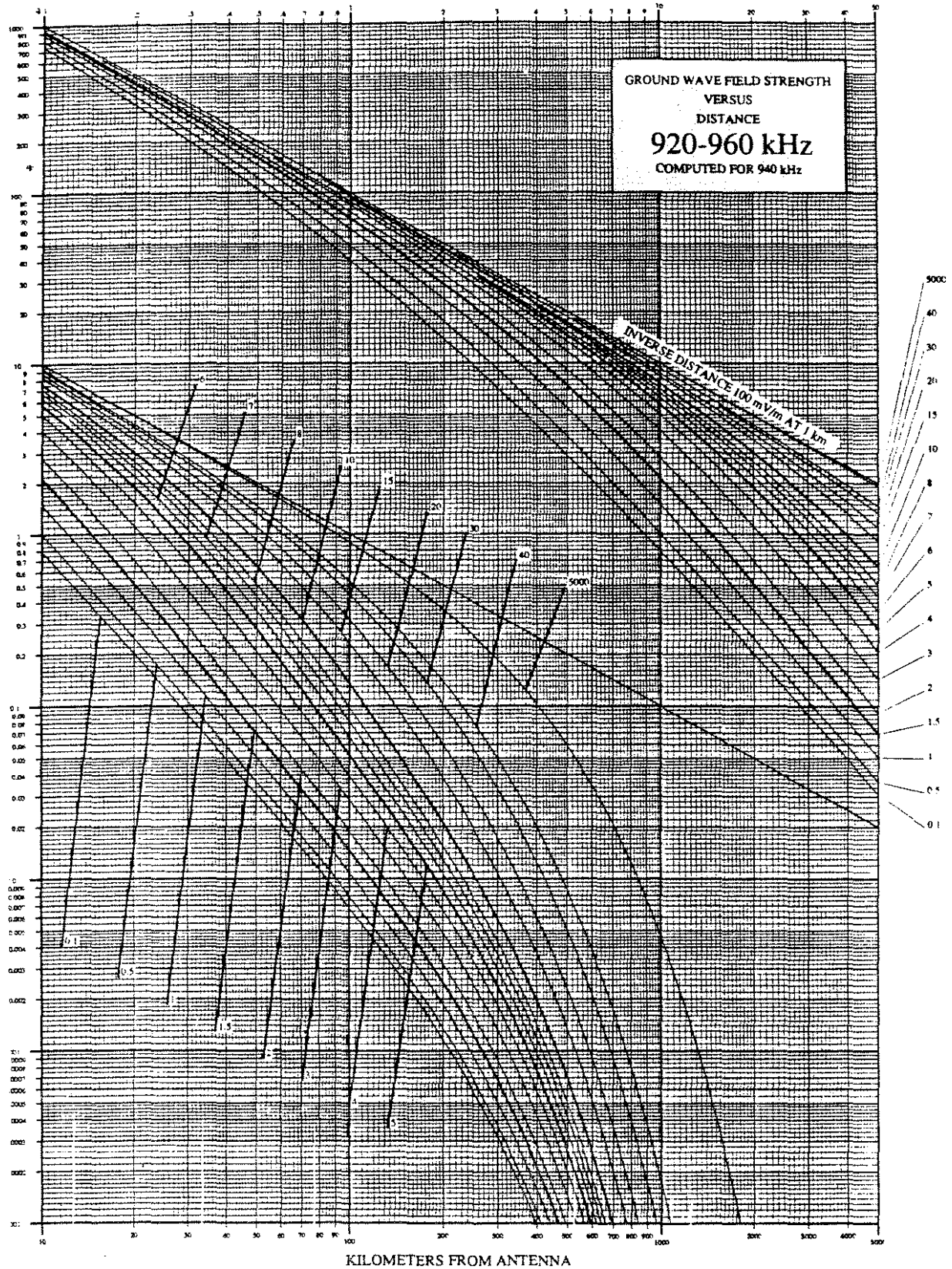

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GRAPH 11

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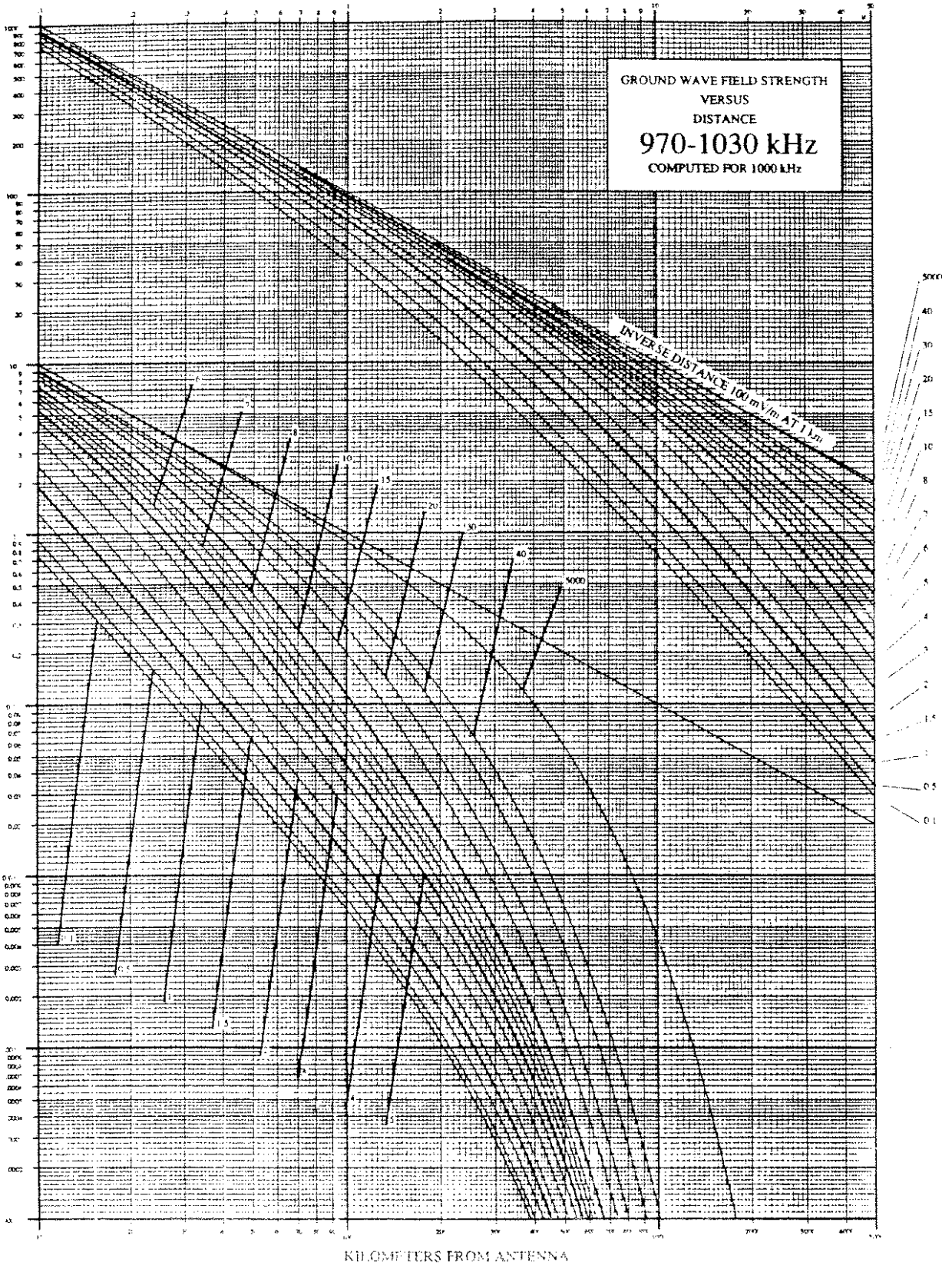

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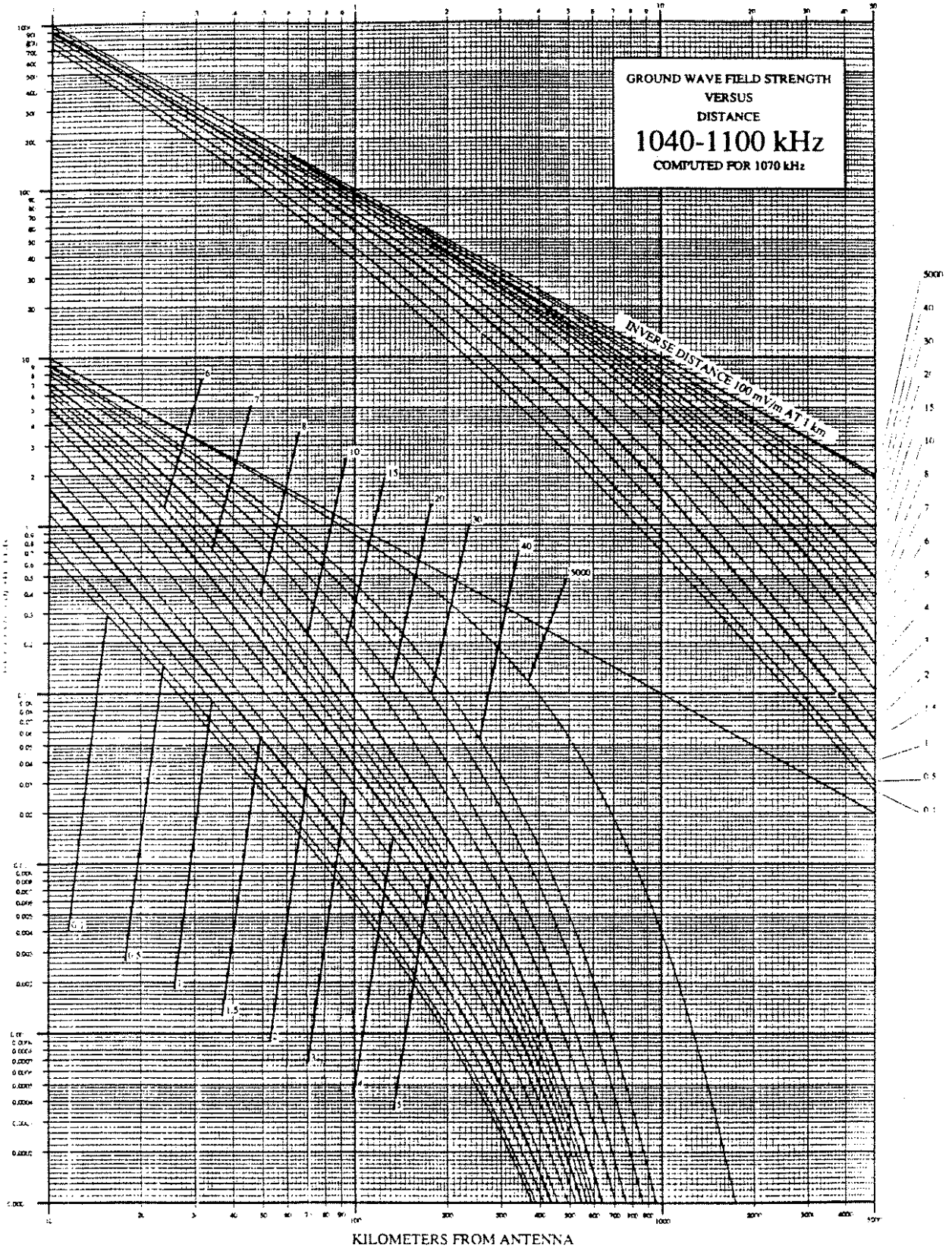
GRAPH 12

KILOMETERS FROM ANTENNA



KILOMETERS FROM ANTENNA

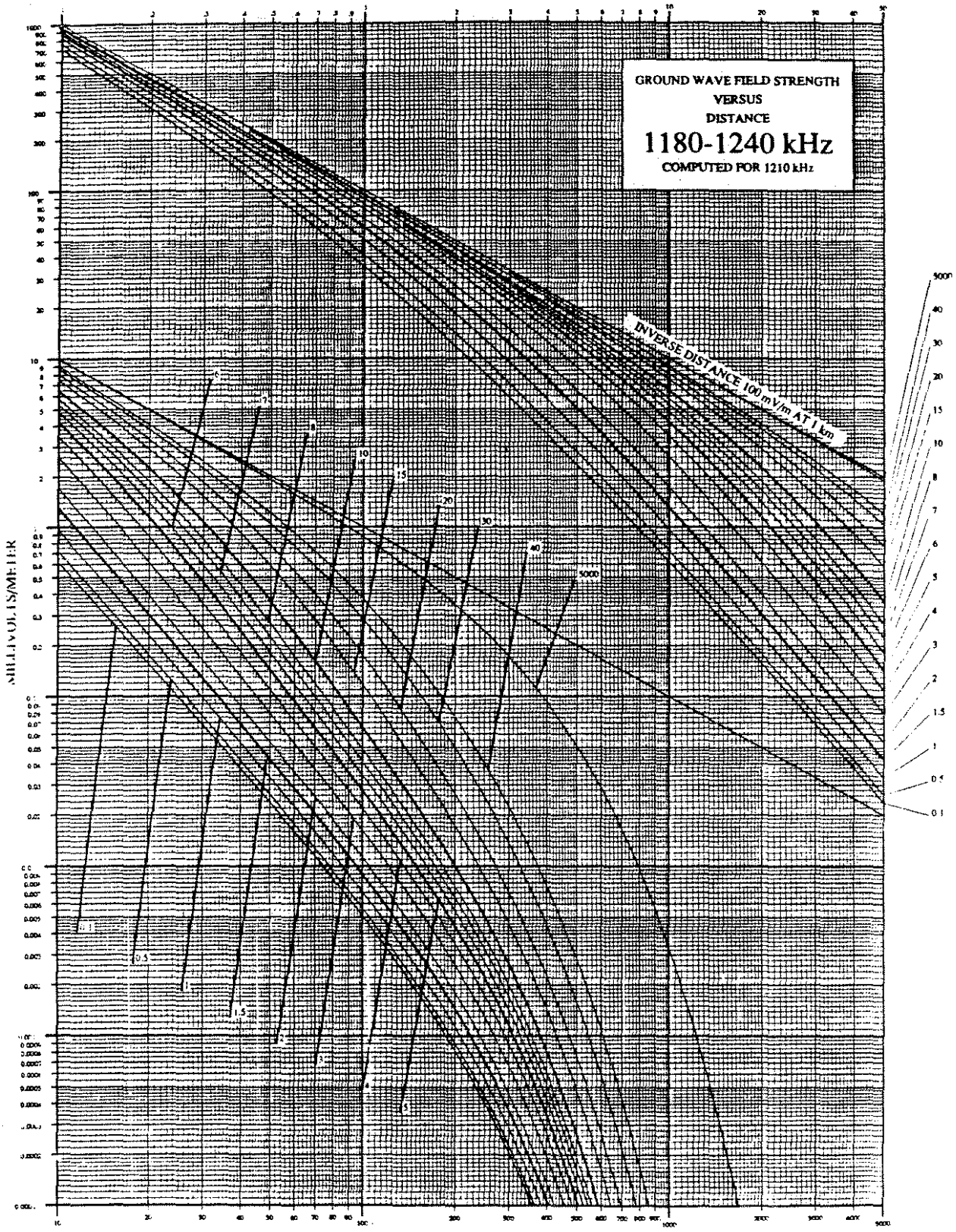
GRAPH 13

KILOMETERS FROM ANTENNA

KILOMETERS FROM ANTENNA

GRAPH 14

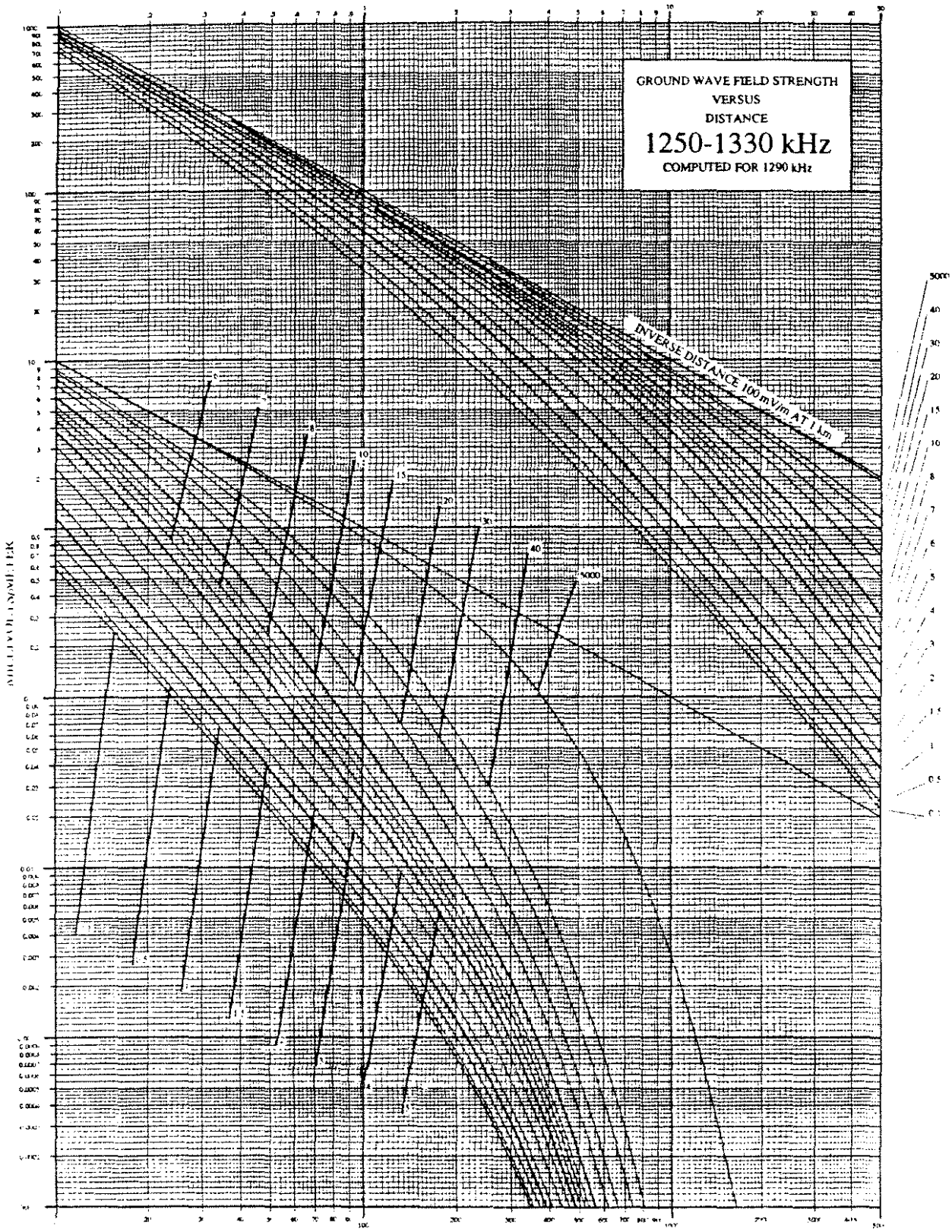
KILOMETERS FROM ANTENNA



KILOMETERS FROM ANTENNA

GRAPH 15

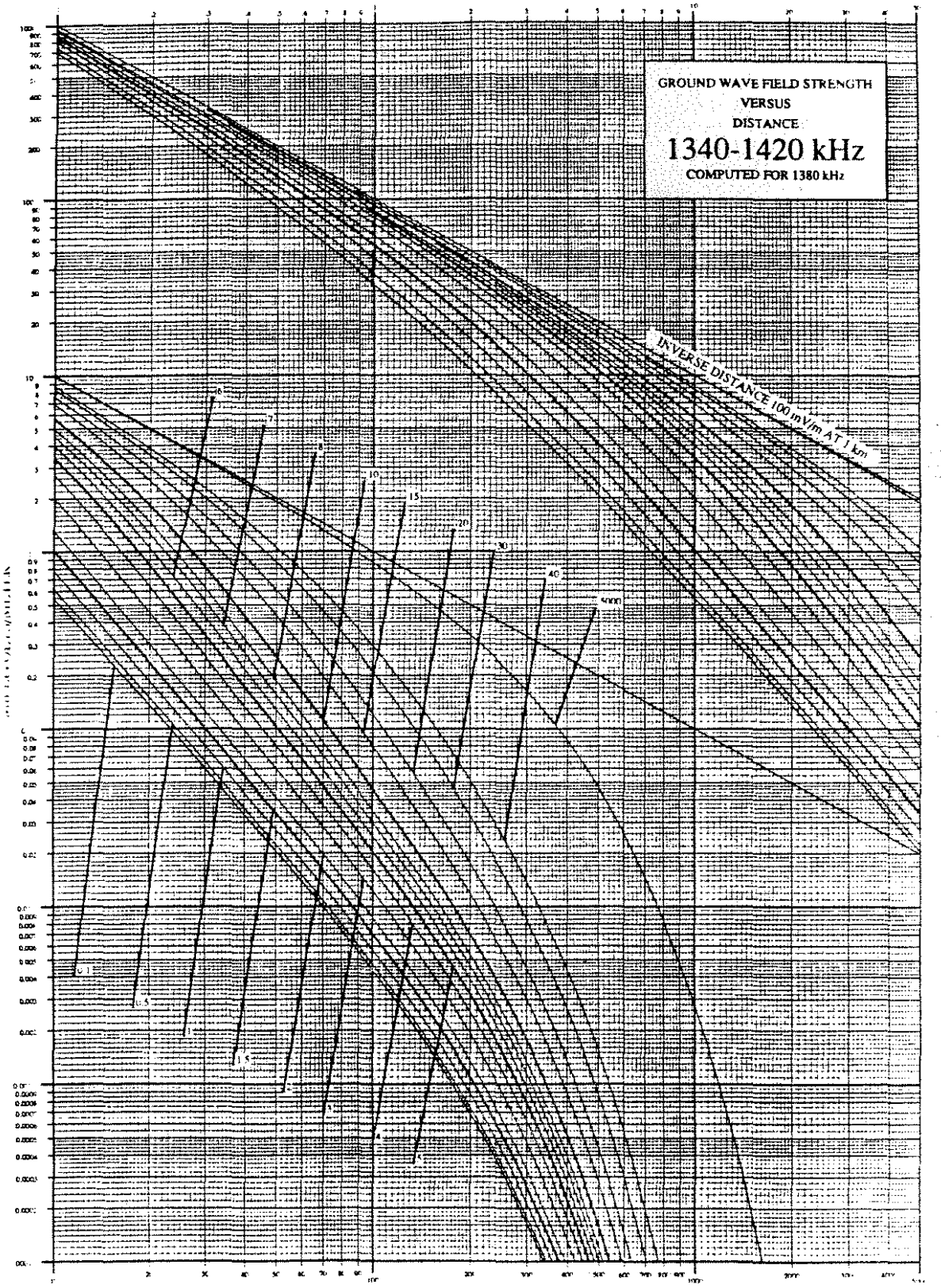
KILOMETERS FROM ANTENNA



KILOMETERS FROM ANTENNA

GRAPH 16

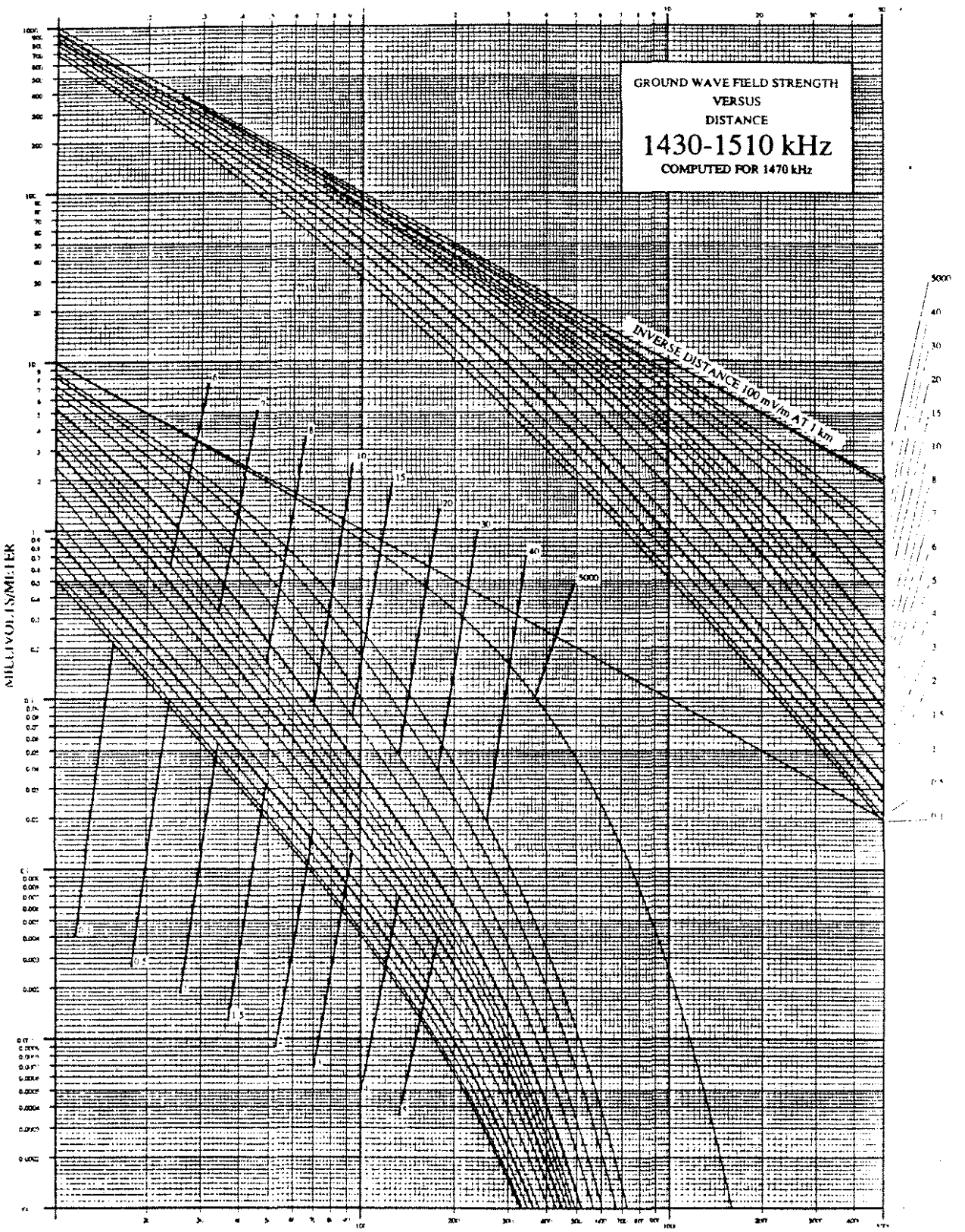
KILOMETERS FROM ANTENNA



KILOMETERS FROM ANTENNA

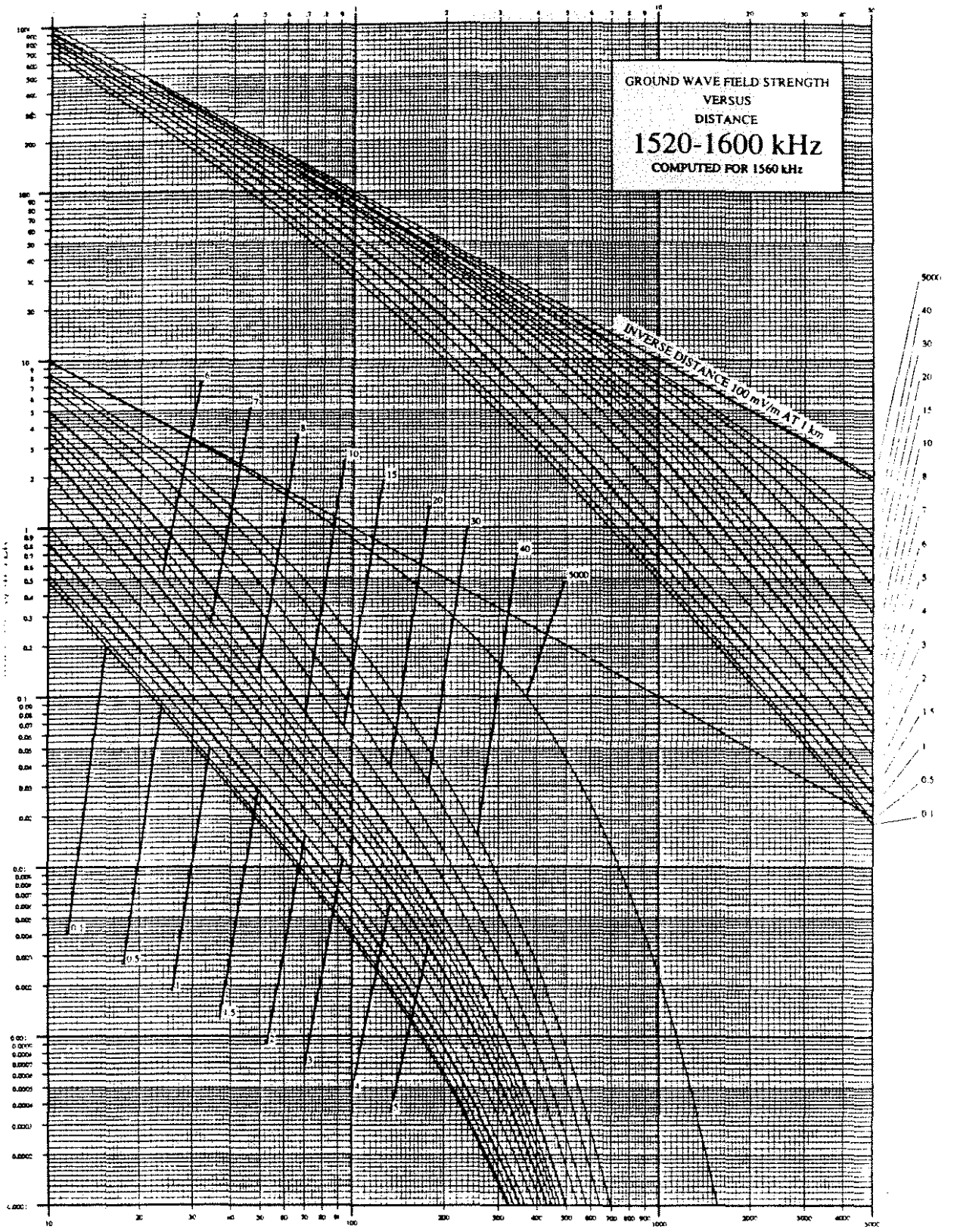
GRAPH 17

KILOMETERS FROM ANTENNA



GRAPH 15

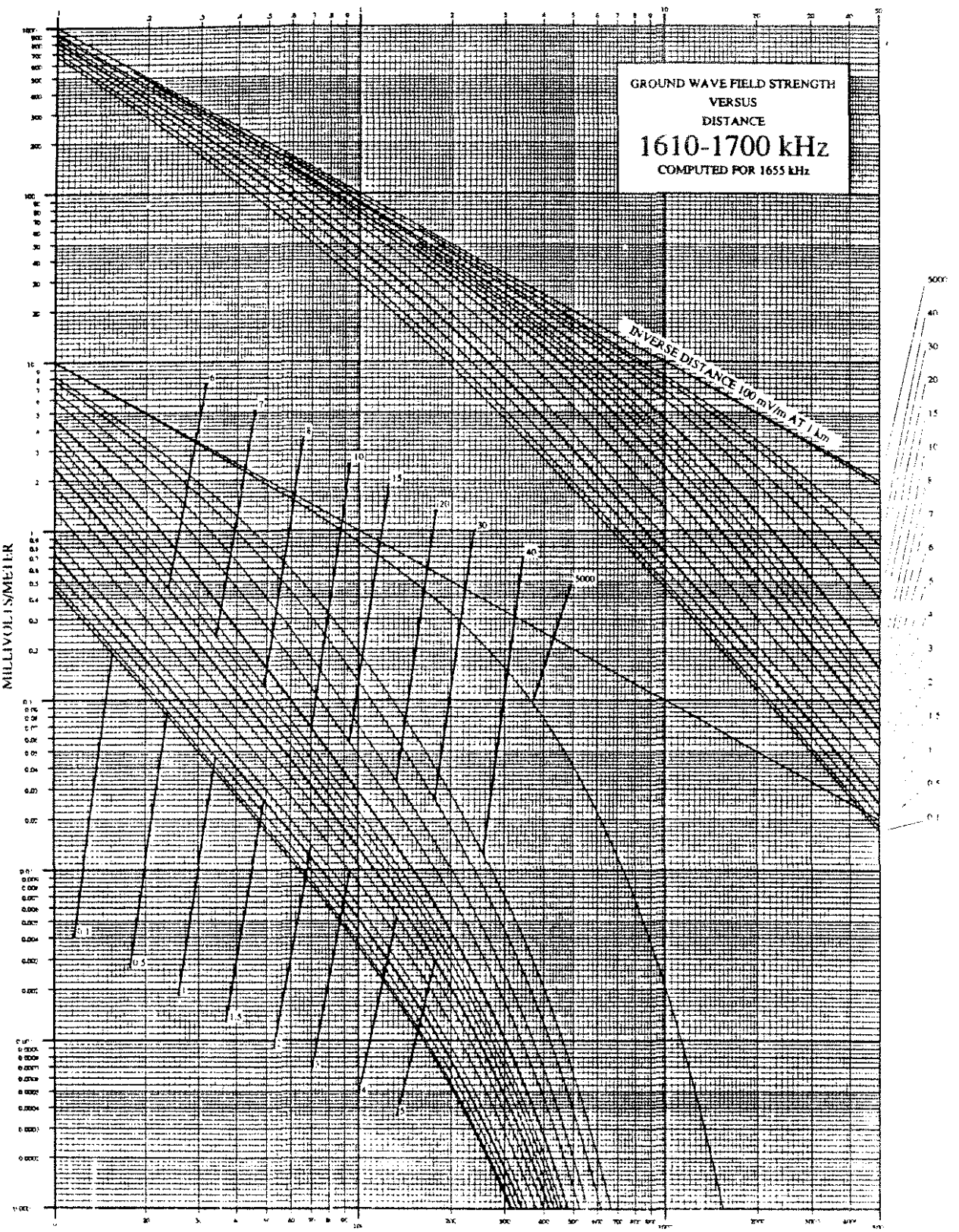
KILOMETERS FROM ANTENNA



KILOMETERS FROM ANTENNA

GRAPH 19

KILOMETERS FROM ANTENNA



KILOMETERS FROM ANTENNA

GRAPH 20

earth curves would indicate. Thus, no attempt should be made to fit experimental data to these curves at the larger distances.

NOTE: For other values of dielectric constant use can be made of the computer program which was employed by the FCC in generating the curves in Graphs 1 to 20. A printout of this program can be ordered from the FCC official copy center whose name and address may be obtained by calling or writing the Consumer Affairs Office, Federal Communications Commission, Washington, D.C. 200554, (202) 632-7000.

(d) At sufficiently short distances (less than 55 kilometers at broadcast frequencies), such that the curvature of the earth does not introduce an additional attenuation of the waves, the curves of Graph 21 may be used for determining the groundwave field strength of transmitting and receiving antennas at the surface of the earth for any radiated power, frequency, or set of ground constants in the following manner: First, lay off the straight inverse distance line corresponding to the power radiated on transparent log-log graph paper similar to that of Graph 21, labelling the ordinates of the chart in terms of field strength, and the abscissae in terms of distance. Next, by means of the formulas given on Graph 21, calculate the value of the numerical distance, p, at 1 kilometer, and the value of b. Then superimpose the log-log chart over Graph 21, shifting it vertically until the inverse distance lines on both charts coincide and shifting it horizontally until the numerical distance at 1 kilometer on Graph 21 coincides with 1 kilometer on the log-log graph paper. The curve of Graph 21 corresponding to the calculated value of b is then traced on the log-log graph paper giving the field strength versus distance in kilometers.

(e) This paragraph consists of the following Graphs 1 to 20 and 21.

Note: The referenced graphs are not published in the CFR, nor will they be included in the Commission's automated rules system. Copies are available by calling or writing the Consumer Affairs Office, Federal Communications Commission, Washington, D.C. 20554, Telephone: (202) 632-7000.

30. Section 73.185 is amended by adding paragraph (c) to paragraph (b) and revising the new paragraph (b), by revising and redesignating paragraphs (d) and (e) as (c) and (d), by removing paragraphs (i) and (j), and revising and redesignating paragraphs (h) and (k) as (e) and (f), and by revising new paragraph (f)(2) to read as follows:

§73.185 Computation of interfering signal.

(a) * * *

(b) For skywave signals from stations operating on all channels, interference shall be determined from the appropriate formulas and Figure 6a contained in §73.190.

(c) The formulas in §73.190(d) depicted in Figure 6a of §73.190, entitled "Angles of Departure versus Transmission Range" are to be used in determining the angles in the vertical pattern of the antenna of an interfering station to be considered as pertinent to transmission by one reflection. To provide for variation in the pertinent vertical angle due to variations of ionosphere height and ionosphere scattering, the curves 2 and 3 indicate the upper and lower angles within which the radiated field is to be considered. The maximum value of field strength occurring between these angles shall be used to determine the multiplying factor to apply to the 10 percent skywave field intensity value determined from Formula 2 in §73.190. The multiplying factor is found by dividing the maximum radiation between the pertinent angles by 100 mV/m.

(d) Example of the use of skywave curves and formulas: Assume a proposed new Class B station from which interference may be expected is to be located at a distance of 724 kilometers from a licensed Class B station. The proposed station specifies geographic coordinates of 40° 00' 00" N and 100° 00' 00" W and the station to be protected is located at an azimuth of 45° true. The critical angles of radiation as determined from Figure 6a of §73.190 are 9.6° and 16.3°. If the vertical pattern of the antenna of the proposed station in the direction of the other station is such that, between the angles of 9.6° and 16.3° above the horizon the maximum radiation is 260 mV/m at one kilometer, the value of the 50% field, as derived from Formula 1 of §73.190, is 0.06127 mV/m at the location in question. To obtain the value of the 10% field, the 50% value must be adjusted by a factor derived from Formula 2 of §73.190. The value in this case is 8.42 dB. Thus, the 10% field is 0.1616 mV/m. Using this in conjunction with the co-channel protection ratio of 26 dB, the resultant night limit from the proposal to the licensed station is 3.232 mV/m which is in excess of 1.0 mV/m, the level permitted under §73.182(q) for new operations.

(e) In the case of an antenna which is intended to be non-directional in the horizontal plane, the vertical distribution of the relative fields should be computed pursuant to §73.160. In the case of an antenna which is directional in the horizontal plane, the vertical pattern in the great circle direction toward the point of reception in question must first be calculated. In cases where the radiation in the vertical plane, at the pertinent azimuth, contains a large lobe at a higher angle than the pertinent angle for one reflection, the method of calculating interference will not be restricted to that just described; each such case will be considered on the basis of the best knowledge available.

(f) In performing calculations to determine permissible radiation from stations operating presunrise or postsunset in accordance with §73.99, calculated diurnal factors will be multiplied by the values of skywave signals for such stations obtained from Formula 1 or 2 of §73.190.

(1) * * *

(2) Constants used in calculating diurnal factors for the presunrise and postsunset periods are contained in paragraphs (f)(2)(i) and (ii) respectively. The columns labeled T<mp> represents the number of hours before and after sunrise and sunset at the path midpoint.

* * * * *

31. Section 73.187 is amended by revising paragraphs (a)(1) and (2), (a)(2)(i), (a)(2)(ii), (a)(3), (a)(3)(i), (a)(3)(ii), and (b) to read as follows:

§73.187 Limitation on daytime radiation.

(a)(1) Except as otherwise provided in paragraphs (a)(2) and (3) of this section, no authorization will be granted for Class B or D facilities on a frequency specified in §73.25 if the proposed facilities would radiate during the period of critical hours (the two hours after local sunrise and the two hours before local sunset) toward any point on the 0.1 mV/m contour of a co-channel U.S. Class A station, at or below the pertinent vertical angle determined from Curve 2 of Figure 6a of §73.190, values in excess of those obtained as provided in paragraph (b) of this section.

(2) The limitation set forth in paragraph (a)(1) of this section shall not apply in the following cases:

(i) Any Class B or D facilities authorized before November 30, 1959; or

(ii) For Class B and D stations authorized before November 30, 1959, subsequent changes of facilities which do not involve a change in frequency, an increase in radiation toward any point on the 0.1 mV/m contour of a co-channel U.S. Class A station, or the move of transmitter site materially closer to the 0.1 mV/m contour of such Class A station.

(3) If a Class B or D station authorized before November 30, 1959, is authorized to increase its daytime radiation in any direction toward the 0.1 mV/m contour of a co-channel U.S. Class A station (without a change in frequency or a move of transmitter site materially closer to such contour), it may not, during the two hours after local sunrise or the two hours before local sunset, radiate in such directions a value exceeding the higher of:

(i) The value radiated in such directions with facilities last authorized before November 30, 1959, or

(ii) The limitation specified in paragraph (a)(1) of this section.

(b) To obtain the maximum permissible radiation for a Class B or D station on a given frequency from 640 through 990 kHz, multiply the radiation value obtained for the given distance and azimuth from the 500 kHz chart (Figure 9 of §73.190) by the appropriate interpolation factor shown in the K_{500} column

of paragraph (c) of this section; and multiply the radiation value obtained for the given distance and azimuth from the 1000 kHz chart (Figure 10 of §73.190) by the appropriate interpolation factor shown in the K_{1000} column of paragraph (c) of this section. Add the two products thus obtained; the result is the maximum radiation value applicable to the Class B or D station in the pertinent directions. For frequencies from 1010 to 1580 kHz, obtain in a similar manner the proper radiation values from the 1000 and 1600 kHz charts (Figures 10 and 11 of §73.190), multiply each of these values by the appropriate interpolation factors in the K'_{1000} and K'_{1600} columns in paragraph (c) of this section, and add the products.

* * * * *

32. Section 73.189 is amended by revising paragraphs (b)(2)(i), (b)(2)(ii), (b)(2)(iii), (b)(3), and (b)(6), to read as follows:

§73.189 Minimum antenna heights or field strength requirements.

* * * * *

(b) * * *

(2) * * *

(i) Class C stations, and stations in Alaska, Hawaii, Puerto Rico and the U.S. Virgin Islands on 1230, 1240, 1340, 1400, 1450 and 1490 kHz that were formerly Class C and were redesignated as Class B pursuant to §73.26(b), 45 meters or a minimum effective field strength of 241 mV/m for 1 kW (121 mV/m for 0.25 kW). (This height applies to a Class C station on a local channel only. Curve A shall apply to any Class C stations in the 48 conterminous States that are assigned to Regional channels.)

(ii) Class A (Alaskan) and Class B and Class D stations other than those covered in §73.189(b)(2)(i), a minimum effective field strength of 282 mV/m for 1 kW.

(iii) Class A stations, a minimum effective field strength of 362 mV/m for 1 kW.

(3) The heights given on the graph for the antenna apply regardless of whether the antenna is located on the ground or on a building. Except for the reduction of shadows, locating the antenna on a building does not necessarily increase the efficiency and where the height of the building is in the order of a quarter wave the efficiency may be materially reduced.

* * * * *

(6) The main element or elements of a directional antenna system shall meet the above minimum requirements with respect to height or effective field

strength. No directional antenna system will be approved which is so designed that the effective field of the array is less than the minimum prescribed for the class of station concerned, or in case of a Class A station less than 90 percent of the ground wave field which would be obtained from a perfect antenna of the height specified by Figure 7 of §73.190 for operation on frequencies below 1000 kHz, and in the case of a Class B or D station less than 90 percent of the ground wave field which would be obtained from a perfect antenna of the height specified by Figure 7 of §73.190 for operation on frequencies below 750 kHz.

33. Section 73.190 is amended by revising paragraphs (a), (b), (c), and (e) to read as follows:

§73.190 Engineering charts and related formulas.

(a) This section consists of the following Figures: 2, r3, 5, 6a, 7, 8, 9, 10, 11, 12, and 13. Additionally, formulas that are directly related to graphs are included.

(b) Formula 1 is used for calculation of 50% skywave field strength values.

Formula **1. Skywave field strength, 50% of the time (at SS+6):**

The skywave field strength, $F_c(50)$, for a characteristic field strength of 100 mV/m at 1 km is given by:

$$F_c(50) = (97.5 - 20\log D) - (2\pi + 4.95\tan^2\phi_M)\sqrt{(D/1000)} \ \text{dB}(\mu\text{V/m})$$

The slant distance, D, is given by:

$$D = \sqrt{40,000 + d^2} \ \text{km}$$

The geomagnetic latitude of the midpoint of the path, ϕ_M, is given by:

$$\phi_M = \arcsin[\sin a_M \sin 78.5^\circ + \cos a_M cos78.5^\circ \cos(69 + b_M)] \ \text{degrees}$$

The short great-circle path distance, d, is given by:

$$d = 111.18d^\circ \ \text{km}$$

Where:

$$d^\circ = \arccos[\sin a_T \sin a_R + \cos a_T \cos a_R \cos(b_R - b_T)] \ \text{degrees}$$

Where:
a_T is the geographic latitude of the transmitting terminal (degrees)
a_R is the geographic latitude of the receiving terminal (degrees)
b_T is the geographic longitude of the transmitting terminal (degrees)
b_R is the geographic longitude of the receiving terminal (degrees)
a_M is the geographic latitude of the midpoint of the great-circle path and is given by:

$$a_M = 90 - \arccos\left[\sin a_R \cos\left(\frac{d^\circ}{2}\right) + \cos a_R \sin\left(\frac{d^\circ}{2}\right)\left\{\frac{\sin a_T - \sin a_R \cos d^\circ}{\cos a_R \sin d^\circ}\right\}\right] \ \text{degrees}$$

b_M is the geographic longitude of the midpoint of the great-circle path and is given by:

$$b_M = b_R + k\left[\arccos\left(\frac{\cos\left(\frac{d^\circ}{2}\right) - \sin a_R \sin a_M}{\cos a_R \cos a_M}\right)\right] \ \text{degrees}$$

Note(1): If $|\phi_M|$ is greater than 60 degrees, equation (1) is evaluated for $|\phi_M| = 60$ degrees.
Note(2): North and east are considered positive; south and west negative.
Note(3): In equation (7), $k = -1$ if $b_R > b_T$, otherwise $k = 1$.

(c) Formula 2 is used for calculation of 10% skywave field strength values.

Formula 2. **Skywave field strength, 10% of the time (at SS+6):**

The skywave field strength, $F_c(10)$, is given by:

$$F_c(10) = F_c(50) + \Delta \text{ dB}(\mu\text{V/m})$$

Where:
$\Delta = 6$ when $|\phi_M| < 40$
$\Delta = 0.2|\phi_M| - 2$ when $40 \leq |\phi_M| \leq 60$
$\Delta = 10$ when $|\phi_M| > 60$

* * * * *

(e) In the event of disagreement between computed values using the formulas shown above and values obtained directly from the figures, the computed values will control.

34. Section 73.1030 is amended by revising the table in paragraph (b) to read as follows:

§73.1030 Notifications concerning interference to radio astronomy, research and receiving installations.

* * * * *

(b) * * *

Frequency range	Field strength	Power flux density * 2/
Below 540 kHz	10	-65.8
540 to 1700 kHz	20	-59.8
1.7 to 470 MHz	10	**-65.8
470 to 890 MHz	30	**-56.2
Above 890 MHz	1	**-85.8

1/ (mV/m) in authorized bandwidth of service.

2/ (dBW/m^2) in authorized bandwidth of service.

* Equivalent values of power flux density are calculated assuming free space characteristic impedance of 376.7 = 120 ohms.

** Space stations shall conform to the power flux density limits at the earth's surface specified in appropriate parts of the FCC rules, but in no case should exceed the above levels in any 4 kHz band for all angles of arrival.

* * * * *

35. Section 73.1125 is amended by adding a note to read as follows:

§73.1125 Station main studio location.

* * * * *

Note: AM stations licensed to a community which simulcast using a frequency in the 535-1605 kHz band along with a frequency in the 1605-1705 kHz band need only have the studio be located within the 5 mV/m contour of the lower band operation during the term of the simultaneous operating authority. Upon termination of the 535-1605 kHz band portion of the multiple frequency operation, the above rule shall then become applicable to the remaining operation in the 1605-1705 kHz band.

36. A new paragraph (c) is added to Section 73.1150 to read as follows:

§73.1150 Transferring a station.

* * * * *

(c) Licensees and/or permittees authorized operation in the 535-1605 kHz band along with operation in the 1605-1705 kHz band pursuant to the Report and Order MM Docket 87-267 will not be permitted to assign or transfer control of

the license or permit for a single frequency during the period that joint operation is authorized.

37. Section 73.1201 is amended by revising paragraph (c)(2) to read as follows:

§73.1201 Station identification.

* * * * *

(c) * * *

(2) Simultaneous AM (535-1605 kHz) and AM (1605-1705 kHz) broadcasts. If the same licensee operates an AM broadcast station in the 535-1605 kHz band and an AM broadcast station in the 1605-1705 kHz band with both stations licensed to the same community and simultaneously broadcasts the same programs over the facilities of both such stations, station identification announcements may be made jointly for both stations for periods of such simultaneous operation.

* * * * *

38. Paragraph (b)(1)ii) of Section 73.1570 is revised to read as follows:

§73.1570 Modulation levels: AM, FM, and TV aural.

* * * * *

(b) * * *

(1) * * *

(ii) For AM stations transmitting telemetry signals for remote control or automatic transmission system operation, the amplitude of modulation of the carrier by the use of subaudible tones must not be higher than necessary to effect reliable and accurate data transmission and may not, in any case, exceed 6%.

* * * * *

39. Section 73.1650 is amended by revising paragraph (b)(2) and adding paragraphs (b)(2)(i) and (b)(2)(ii) to read as follows:

§73.1650 International broadcasting agreements.

* * * * *

(b) * * *

(2) Regional Agreements for the Broadcasting Service in Region 2:

(i) MF Broadcasting 535-1605 kHz, Rio de Janeiro, 1981.

(ii) MF Broadcasting 1605-1705 kHz, Rio de Janeiro, 1988.

* * * * *

40. A note is added at the end of Section 73.1665 to read as follows:

§73.1665 Main transmitters.

* * * * *

Note: Pending the availability of AM broadcast transmitters that are type-accepted for use in the frequency band 1605-1705 kHz, transmitters which appear on the FCC's "Radio Equipment List" that are type-accepted for use in the 535-1605 kHz band may be utilized in the 1605-1705 kHz band if it can be shown that the requirements of §73.44 have been met. Positive outcome of the manufacturer's application for type-acceptance will supersede the applicability of this note.

41. Paragraph (c) in Section 73.1705 is revised to read as follows:

§73.1705 Time of operation.

* * * * *

(c) AM stations in the 535-1705 kHz band will be licensed for unlimited time. In the 535-1605 kHz band, stations that apply for share time and specified hours operations may also be licensed. AM stations licensed to operate daytime-only and limited-time may continue to do so; however, no new such stations will be authorized.

42. Section 73.1725 is revised to read as follows:

§73.1725 Limited time.

(a) Operation is applicable only to Class B (secondary) AM stations on a clear channel with facilities authorized before November 30, 1959. Operation of the secondary station is permitted during daytime and until local sunset if located west of the Class A station on the channel, or until local sunset at the dominant station if located east of that station. Operation is also permitted during nighttime hours not used by the Class A station or stations on the channel.

(b) No authorization will be granted for:

(1) A new limited time station;

(2) A limited time station operating on a changed frequency;

(3) A limited time station with a new transmitter site materially closer to the 0.1 mV/m contour of a co-channel U.S. class A station; or

(4) Modification of the operating facilities of a limited time station resulting in increased radiation toward any point on the 0.1mV/m contour of a co-channel U.S. class A station during the hours after local sunset in which the limited time station is permitted to operate by reason of location east of the class A station.

(c) The licensee of a secondary station which is authorized to operate limited time and which may resume operation at the time the Class A station (or stations) on the same channel ceases operation shall, with each application for renewal of license, file in triplicate a copy of its regular operating schedule. It shall bear a signed notation by the licensee of the Class A station of its objection or lack of objection thereto. Upon approval of such operating schedule, the FCC will affix its file mark and return one copy to the licensee authorized to operate limited time. This shall be posted with the station license and considered as a part thereof. Departure from said operating schedule will be permitted only pursuant to §73.1715 (Share time).

43. Section 73.1740 is amended by revising paragraph (a)(1)(i) to read as follows:

§73.1740 Minimum operating schedule.

(a) * * *

(1) * * *

(i) Class D stations which have been authorized nighttime operations need comply only with the minimum requirements for operation between 6 a.m. and 6 p.m., local time.

* * * * *

44. New paragraphs (c) and (d) and Notes 1 and 2 are added to Section 73.3517 to read as follows:

§73.3517 Contingent applications.

* * * * *

(c) Upon payment of the filing fees prescribed in §1.1111 of this chapter, the Commission will accept two or more applications filed by existing AM licensees for modification of facilities that are contingent upon granting of both, if

granting such contingent applications will reduce interference to one or more AM stations or will otherwise increase the area of interference-free service. The applications must state that they are filed pursuant to an interference reduction arrangement and must cross-reference all other contingent applications.

(d) Modified proposals curing conflicts between mutually exclusive clusters of applications filed in accordance with section (c) will be accepted for 60 days following issuance of a public notice identifying such conflicts.

Note 1: No application to move to a frequency in the 1605-1705 kHz band may be part of any package of contingent applications associated with a voluntary agreement.

Note 2: In cases where no modified proposal is filed pursuant to section (d), the Commission will grant the application resulting in the greatest net interference reduction.

45. Paragraph (i) in Section 73.3550 is revised to read as follows:

§73.3550 Requests for new or modified call sign assignments.

* * * * *

(i) Stations in different broadcast services (or operating jointly in the 535-1605 kHz band and in the 1605-1705 kHz band) which are under common control may request that their call signs be conformed by the assignment of the same basic call sign if that call sign is not being used by a non-commonly owned station. For the purposes of this paragraph, 50% or greater common ownership shall constitute a prima facie showing of common control.

* * * * *

46. Section 73.3555 is amended by revising Note 4 and adding new Notes 8 and 9 and 10 to read as follows:

§73.3555 Multiple ownership.

* * * * *

Note 4: Paragraphs (a) through (d) of this section will not be applied to require divestiture, by any licensee, of existing facilities, and will not apply to applications for increased power for Class C stations, to applications for assignment of license or transfer of control filed in accordance with §73.3540(f) or §73.3541(b) of this part, or to applications for assignment of license or transfer of control to heirs or legatees by will or intestacy if no new or increased overlap would be created between commonly owned, operated, or controlled broadcast stations in the same service and if no new encompassment of communities proscribed in paragraphs (b) and (c) of

this section as to commonly owned, operated, or controlled broadcast stations or daily newspapers would result. Said paragraphs will apply to all applications for new stations, to all other applications for assignment or transfer, and to all applications for major changes in existing stations except major changes that will result in overlap of contours of broadcast stations in the same service with each other no greater than already existing. (The resulting areas of overlap of contours of such broadcast stations with each other in such major change cases may consist partly or entirely of new terrain. However, if the population in the resulting overlap areas substantially exceeds that in the previously existing overlap areas, the Commission will not grant the application if it finds that to do so would be against the public interest, convenience, or necessity.) Commonly owned, operated, or controlled broadcast stations, with overlapping contours or with community-encompassing contours prohibited by this section may not be assigned or transferred to a single person, group, or entity, except as provided above in this note. If a commonly owned, operated, or controlled broadcast station and daily newspaper fall within the encompassing proscription of this section, the station may not be assigned to a single person, group or entity if the newspaper is being simultaneously sold to such single person, group or entity.

* * * * *

Note 8: Paragraph (a)(1) of this section will not apply to an application for an AM radio license in the 535-1605 kHz band where grant of such application will result in the overlap of 5 mV/m groundwave contours of the proposed station and that of another AM station in the 535-1605 kHz band that is commonly owned, operated or controlled if the applicant shows that a significant reduction in interference to adjacent or co-channel stations would accompany such common ownership. Such AM overlap cases will be considered on a case-by-case basis to determine whether common ownership, operation or control of the stations in question would be in the public interest. Applicants in such cases must submit a contingent application for the major or minor facilities change needed to achieve the interference reduction along with the application which seeks to create the 5 mV/m overlap situation.

Note 9: Paragraph (a)(1) of this section will not apply to an application for an AM radio license in the 1605-1705 kHz band where grant of such application will result in the overlap of the 5 mV/m groundwave contours of the proposed station and that of another AM station in the 535-1605 kHz band that is commonly owned, operated or controlled. Paragraphs (d)(1)(i) and (d)(1)(ii) of this section will not apply to an application for an AM radio license in the 1605-1705 kHz band by an entity that owns, operates, controls or has a cognizable interest in AM radio stations in the 535-1605 kHz band.

Note 10: Authority for joint ownership granted pursuant to Note 9 will expire at 3:00 a.m. local time on the fifth anniversary of the date of issuance of a construction permit for an AM radio station in the 1605-1705 kHz band.

47. Section 73.3564 is amended by adding a new paragraph (e) to read as follows:

§73.3564 Acceptance of applications.

* * * * *

(e) Applications for operation in the 1605-1705 kHz band will be accepted only if filed pursuant to the terms of §73.30(b).

48. Section 73.3570 is redesignated as Section 73.23.

49. Section 73.3571 is amended by revising paragraphs (a), and (a)(1), by adding a new paragraph (a)(3), by removing paragraphs (d)(1), (d)(4), and (e), by revising and redesignating paragraphs (d)(2) and (d)(3) as (d)(1) and (d)(2), by redesignating paragraphs (f) through (i) as (e) through (h) and revising new paragraphs (f) and (h), by redesignating paragraphs (j)(1), (j)(2), (j)(3), and (j)(4) as (i)(1), (i)(2), (i)(3), and (i)(4) and revising the text of new paragraph (i)(1), and by redesignating paragraphs (k) and (l) as paragraphs (j) and (k) to read as follows:

§73.3571 Processing of AM broadcast station applications.

(a) Applications for AM broadcast facilities are divided into three groups.

(1) In the first group are applications for new stations or for major changes in the facilities of authorized stations. A major change is any increase in power except where accompanied by complementary reduction of antenna efficiency which leads to the same amount, or less, radiation in all directions (in the horizontal and vertical planes when skywave propagation is involved, and in the horizontal plane only for daytime considerations), relative to the presently authorized radiation levels], or any change in frequency, hours of operation, or community of license. However, the FCC may, within 15 days after the acceptance for filing of any other application for modification of facilities, advise the applicant that such application is considered to be one for a major change and therefore is subject to the provisions of §§73.3580 and 1.1111 pertaining to major changes.

(2) * * *

(3) The third group consists of applications for operation in the 1605-1705 kHz band which are filed subsequent to Commission notification that allotments have been awarded to petitioners under the procedure specified in §73.30.

* * * * *

(d) Applications proposing to increase the power of an AM station are subject to the following requirements:

(1) In order to be acceptable for filing, any application which does not involve a change in site must propose at least a 20% increase in the station's nominal power.

(2) Applications involving a change in site are not subject to the requirements in paragraph (d)(1) of this section.

* * * * *

(f) Applications for change of license to change hours of operation of a Class C station, to decrease hours of operation of any other class of station, or to change station location involving no change in transmitter site will be considered without reference to the processing line.

* * * * *

(h) When an application which has been designated for hearing has been removed from the hearing docket, the application will be returned to its proper position (as determined by the file number) in the processing line. Whether or not a new file number will be assigned will be determined pursuant to paragraph (i) of this section, after the application has been removed from the hearing docket.

(i)(1) A new file number will be assigned to an application for a new station, or for major changes in the facilities of an authorized station, when it is amended to change frequency, to increase power, to increase hours of operation, or to change station location. Any other amendment modifying the engineering proposal, except an amendment regarding the type of equipment specified, will also result in the assignment of a new file number unless such amendment is accompanied by a complete engineering study showing that the amendment would not involve new or increased interference problems with existing stations or other applications pending at the time the amendment is filed. If, after submission and acceptance of such an engineering amendment, subsequent examination indicates new or increased interference problems with either existing stations or other applications pending at the time the amendment was received at the FCC, the application will then be assigned a new file number and placed in the processing line according to the numerical sequence of the new file number.

* * * * *

50. New paragraph (c) is added to Section 73.3598 to read as follows:

§73.3598 Period of construction.

* * * * *

(c) An existing AM station operating in the 535-1605 kHz band that receives a conditional permit to operate in the 1605-1705 kHz band; such

permit shall specify a period of not more than 18 months from the date of issuance of the original construction permit within which construction shall be completed and application for license filed.

51. Section 73.4160 is removed.

52. Section 73.4255 is revised to read as follows:

§73.4255 Tax certificates: Issuance of.

(a) See Public Notice, FCC 76-337, dated April 21, 1976. 59 FCC 2d, 91; 41 FR 17605, April 27, 1976.

(b) See Report and Order MM Docket 87-267, FCC -- adopted, . FCC Rcd ; FR .

Part 90 of Title 47 of the CFR is amended as follows:

53. The authority citiation for part 90 continues to read as follows:

Authority: 47 U.S.C. 154 and 303.

54. Section 90.17(b) is amended by adding 1620, 1630, 1640, 1650, 1660, 1670, 1680, 1690 and 1700 kHz in the Table of Frequencies as follows:

§90.17 Local Government Radio Service

(a) * * * * *

(b) Frequencies available.

* * * * *

Local Government Radio Service Frequency Table

Frequency or band	Class of station(s)	Limitations
Kilohertz:		
530	Base (T.I.S.)	23
1610	do	23
1620	do	23
1630	do	23
1640	do	23
1650	do	23
1660	do	23
1670	do	23
1680	do	23
1690	do	23
1700	do	23
2726	Base or Mobile	1

* * * * *

55. Section 90.242 is amended by revising the first sentence of (a), the first sentence of (a)(2)(i), and (a)(2)(ii) to read as follows:

§90.242 Travelers Information Stations.

(a) The frequencies 530, 1610, 1620, 1630, 1640, 1650, 1660, 1670, 1680, 1690, and 1700 kHz. * * *

* * * * *

(a)(2)(i) A statement certifying that the transmitting site of the Travelers Information will be located at least 15.0 km (9.3 miles) measured orthogonally

outside the measured 0.5 mV/meter daytime contour of any AM broadcast station operating on a first adjacent channel or at least 130 km (80.6 miles) outside the measured 0.5 mV/m daytime contour of any AM broadcast station operating on the same channel. * * *

(a)(2)(ii) In consideration of possible cross-modulation and inter-modulatioon interference effects which may result from the operation of a Travelers Information Station in the vicinity of an AM broadcast station on the second or third adjacent channel, the applicant shall certify that he has considered these possible interference effects and, to the best of his knowledge, does not forsee harmful interference occuring to broadcast stations operating on second or third adjacent channels.

* * * * *

Appendix 6

Initial Regulatory Flexibility Analysis

I. **Reason for the Action:**

Channel congestion, interference, low fidelity receivers, and the higher technical quality of newer services have worked to dull AM radio's competitive edge. In particular, current AM broadcast rules do not reflect advances in technological knowledge and applications that could improve the quality of the AM service.

II. **Objective of this Action:**

The goal of the proposed action is to improve the quality of the AM broadcast service and thus, with the participation of AM broadcasters and radio manufacturers, to revitalize its role in broadcast competition.

III. **Legal Basis:**

Authority for the proposals contained in this decision is provided in Sections 4(i) and 303 of the Communications Act of 1934, as amended.

IV. **Number and Type of Small Entities Affected by the Proposed Rule:**

Approximately 5,000 currently operating AM radio stations would potentially benefit from the proposals, in addition to radio manufacturers.

V. **Reporting, Recordkeeping, and Other Compliance Requirements Inherent in the Proposed Rule:**

One proposal suggested in this document would permit the Commission to issue tax certificates to broadcasters agreeing to reduce interference to cochannel or adjacent channel stations. The proposals, on the whole, should reduce rather than increase reporting and recordkeeping requirements on AM broadcasters and potential AM broadcasters. However, in cases involving directional antennas, we would require an engineering study demonstrating antenna pattern achievement. These studies would be less budensome than those required for stations in the existing band. The proposed reimposition of the AM-FM nonduplication rule could raise operating costs for affected radio stations. Licensees interested in migrating to the expanded band would have to submit non-binding letter of intent with the Commission. The Commission would establish a filing window during which time stations in the existing band could file for authority to move to the expanded band, supporting their request with technical exhibits showing how the applicant should be ranked. But, unlike the current application process, no showing would be required for the proposed new operation; the technical exhibits would address only the applicant's currently licensed station. Finally, offsetting any increase in compliance requirements resulting from our

proposals in this proceeding, the proposed relaxation of the AM multiple ownership rules could allow licensees to own two stations in the same market or community, and share a main studio, thus reducing the stations' administrative costs and workload.

VI. **Federal Rules which Overlap, Duplicate, or Conflict with the Proposed Rule:**

None.

VII. **Any Significant Alternative Minimizing Impact on Small Entities and Consistent with the Stated Objective of the Action:**

All of the proposals are intended to benefit AM broadcasters by increasing their ability to compete for listeners through optimal use and recognition of technological advances.